

Refuge Notebook

Volume 8 • 2006

This volume was compiled in 2016 by Jennifer Peura from the Kenai National Wildlife Refuge's archive of *Refuge Notebook* articles. Formatting has been improved, some hyperlinks (URI's) have been updated, and minor edits were made, but the articles have mostly been unchanged.

Contents

Contents	iii
1 Early Refuge Manager John Hakala loved the Kenai Peninsula and Alaska, <i>Ted Bailey</i>	1
2 What do homeschoolers, movies, snowshoeing and the Arctic Winter Games have in common?, <i>Michelle Ostrowski</i>	4
3 Invasive plants lack natural enemies but may also have chemical weapons, <i>Ed Berg</i>	5
4 Kenai Peninsula owls are in the market for a good clean home, <i>Todd Eskelin</i>	7
5 Rare birds reappear, <i>Robin West</i>	9
6 Hidden Lake ice fishing adventure, <i>Chis Johnson</i>	10
7 Muskrat Winter Olympics: endurance under the ice, <i>Ted Bailey</i>	12
8 McKay's Bunting makes extremely rare appearance on Kenai, <i>Todd Eskelin</i>	14
9 Warmer winters and warmer nights a mixed blessing, <i>Ed Berg</i>	15
10 Wildlife hotline needs your call!, <i>Rick Ernst</i>	18
11 "Crystals and Air" "Skiing with Wildlife" "A Refuge for Classic Skiing", <i>Dave Kenagy</i>	20
12 Another wildland fire season is fast approaching, <i>Doug Newbould</i>	22
13 Volunteers are increasingly important as budgest decline, <i>Bill Kent</i>	24
14 What "Seis" are your lines?, <i>Jason Ray</i>	25
15 What does the Kenai National Wildlife Refuge have to offer youth this summer? Youth Conservaiton Crops Positions, <i>Tai Davis</i>	27
16 Shorebird workshop aims to improve your identification skills, <i>Todd Eskelin</i>	29
17 Investing in the future of the Kenai National Wildlife Refuge, <i>Jim Neely</i>	30
18 Hunters in the 1890s called for a national wildlife refuge on the Kenai, <i>Jim Hall</i>	32
19 National Trails Day: "experience your outdoors", <i>Scott Slavik</i>	34
20 Dandelion Sundae: an opportunity to learn about invasive plant species, <i>Toby Burke</i>	36
21 Blackbird of the bogs: an early victim of global warming?, <i>Ted Bailey</i>	38
22 Summer programs at Kenai National Wildlife Refuge, <i>Candace Ward</i>	40
23 Signs of Summer: Loon chicks appearing on local lakes, <i>Liz Jozwiak</i>	41

24 American Marten: A mammal barometer of global climate change, <i>Andy Baltensperger</i>	43
25 Wet summer may prevent planned prescribed fires on the Refuge, <i>Doug Newbould</i>	45
26 Skilak Lake birds trying on new colored leg bands, <i>Todd Eskelin</i>	46
27 At what cost?, <i>Jim Neely</i>	48
28 YELLOWJACKETS: Dangerous but Beneficial, <i>Matthew Bowser</i>	50
29 Hunter education important to the future of hunting, <i>Robin West</i>	52
30 Lichens and bears on the Katmai Coast, <i>Ed Berg</i>	54
31 Youth Conservation Corps at Kenai Refuge completes another of successful summer of work, <i>Craig Moore</i>	56
32 From the Land of Nessie, The Scots invade, hard-working Scots, <i>Dave Kenagy</i>	57
33 Leaf miners—tiny sculptors in the Kenai forests, <i>John Lundquist</i>	59
34 Katmai National Park and Preserve: a huge wilderness with lots of bears and few human footprints, <i>Ed Berg</i>	61
35 Unexpected wildlife encounters make lasting memories, <i>Ted Bailey</i>	63
36 Fall fun at Kenai National Wildlife Refuge, <i>Nicole Gustine</i>	65
37 Mutations, disease, bugs, and chemicals can all amplify fireweed flowering, <i>Ed Berg</i>	66
38 A busy construction season improves refuge facilities, <i>Brenda Nichol</i>	68
39 Variety is the spice of life, <i>John Morton</i>	70
40 Another day, another hat, <i>Scott Slavik</i>	72
41 Refuge education specialist migrates North, <i>Claire Caldes</i>	74
42 Miximalist versus minimalist technologies for bear safety, Part 1, <i>Ed Berg</i>	76
43 Miximalist versus minimalist technologies for bear safety, Part 2, <i>Ed Berg</i>	78
44 Kenai Refuge's 65 th Birthday—and my brother's, <i>Bill Kent</i>	80
45 Giving thanks for the 2006 National Fire Management Workshop, <i>Doug Newbould</i>	81
46 Global warming will bring more forest fires all over the Earth, <i>Ed Berg</i>	82
47 DIVERSITÉ, <i>Matt Bowser</i>	84
48 Bugging out: Intern learns more about Alaska than just lack of igloos, <i>Charlotte Hockin</i>	86
49 Kenai Refuge introduces newest employee, <i>Rob Barto</i>	87

50 Soldotna Area Christmas Bird Count slated for Saturday, December 30, 2006, <i>Elizabeth Jozwiak and Jack Sinclair</i>	89
--	----

Early Refuge Manager John Hakala loved the Kenai Peninsula and Alaska

by Ted Bailey

I was saddened to learn that one of the Kenai National Wildlife Refuge's earliest refuge managers John Hakala died on January 3 in Fairbanks. Although I never worked on the refuge when John was its manager, he and his wife Mae were our neighbours and friends for over twenty years. And their black Labrador retriever "Musta" was always happy to see us. We celebrated and shared meals together with them on many holidays during those years until his wife Mae passed away in 1996. We then continued our friendship with John until he moved to Fairbanks in 2000 to be closer to his relatives. During this period I had many conversations with John about his experiences flying B-25s in the then U. S. Army Air Force during World War II, his later adventures working in Alaska and as manager of the Kenai National Moose Range before it was re-designated the Kenai National Wildlife Refuge in 1980.

John was one of several unique World War II veterans who after serving their country in the military in Alaska eventually returned to serve it again as a civilian in the Bureau of Sport Fisheries and Wildlife, later to become the U.S. Fish and Wildlife Service. After World War II ended some veterans sought contemplative lives. Thomas Merton, the Trappist monk and one of the great spiritual writers of the 20th Century wrote that after the war ended, his monastery was flooded beyond its capacity with World War II veterans seeking solitude and peace as they searched to begin a new life.

Other veterans sought meaningful lives by returning to a beautiful and wild land they had once experienced, a land that was far from the hustle and bustle of their native homes. With that yearning for beautiful places and a sense of adventure they eventually returned to Alaska. They came not with a desire to become wealthy or politically powerful but to help maintain wild and beautiful places they had seen, where ducks and geese nested by the thousands, where caribou migrated far beyond the distant horizon and where moose, bears, wolves and other wildlife still lived in near pristine environments. John Hakala

was one among those unique veterans that returned to Alaska.

John was born in the mining town of Ironwood in upper Michigan on September 12, 1919, the second oldest in a Finnish family of five brothers and three sisters. After graduating from high school in 1940, he sought adventure by joining the U.S. Army Air Corp with the intention of becoming a pilot like one of his friends. Although frustrated by his initial attempts to be accepted for pilot training, he eventually succeeded and, despite wanting to fly fighters, was trained to fly medium-range B-25 bombers, an aircraft suddenly made famous by then Lieutenant Colonel James Doolittle who with fifteen other B-25s took off from the carrier Hornet on April 18, 1942 and made a surprise aerial attack on Tokyo, Japan.

Later that same year on December 7, 1942, exactly one year after the attack on Pearl Harbor, John was in Anchorage waiting to fly a new B-25 that had been flown up over the Alaskan Highway and then down from Fairbanks to Anchorage. It was during his brief time in Anchorage that he first flew over the Kenai Peninsula in his B-25, already aware from a hometown newspaper clipping sent to him that President Franklin Roosevelt had established Kenai National Moose Range there on December 16, 1941 only nine days after the attack on Pearl Harbor. He said that after seeing the beauty, wildness and numbers of moose on the Kenai Peninsula during that flight that he would someday like to return to the Kenai Peninsula if he survived the war.

After his brief stay in Anchorage he flew to the Alaska Peninsula and flew missions out of bases on Unalakleet, Adak and Amchitka Islands, first repeatedly bombing the then Japanese-held base at Kiska and later flying on extremely long missions to the Kurile Islands which were a part of Japan in the western Pacific. After returning from one long mission his home base was fogged in, his aircraft was running low on fuel and he had no place to land. But luckily his May-Day messages were picked up, relayed to the Navy and they directed him to a then secret base being con-

structed on Attu Island. Flying on instruments and leading other B-25's, he descended through the fog, homing in on a radio signal just turned on and being sent out by a Navy destroyer. His lagging and unadjusted altimeter indicated he was already flying below sea level! Fearing he would crash into the sea or a mountain at any moment he finally saw white-caps on the ocean ahead of him and then spotted the almost completed steel-matted runway being built beneath him. Making a timed 270 degree turn in the fog—he had no visual reference—his crew frantically hand-pumped down the landing gear because his aircraft's primary hydraulic system had been destroyed by enemy gunfire. Without flaps to slow the aircraft down he landed just as both engines stopped from the lack of fuel. He then veered off the runway into the mud to allow the other B-25s he was leading behind him to safely land.

Later in the war John was assigned to the South Pacific. He flew a B-25 across the Pacific from California to Hawaii, Christmas Island, Tarawa, Guadalcanal, and New Guinea and eventually on to the Philippine Islands where he was assigned to a base on the Palawan Islands. Then in August 1945 while on a bombing mission with the plane's bomb bay doors already open on a bombing run, his radio operator said they had just received a message that the war was over. Elated, John ordered the bomb bay doors closed and headed back to his base. Five years later after he had married the girl from a farm across from that of his parents in Michigan and, after receiving a degree in forestry from Michigan Technological University, John and Mae on July 4, 1950 crossed the Alaskan border pulling a small house trailer behind their truck.

They were on their way to the University of Alaska in Fairbanks where John's research on beavers would two years later earn him the first Masters degree in Wildlife Management given to a student at the university. That same year, 1950, to earn money for college to supplement his GI Bill he accepted a summer job on the Kenai National Moose Range establishing research study plots in the 1947 burn—research plots that are still being periodically surveyed over fifty years later to learn how forests on the Kenai Peninsula responded to the biggest wildfire ever recorded on the peninsula. Biologists working on the refuge today refer to these vegetation study plots as the "Hakala Plots."

After graduating from the University of Alaska John accepted a position in Kotzebue to be in charge of the reindeer herds then being established under the

Alaska Reindeer Service of the Bureau of Indian Affairs. Between 1952 and 1958 John and Mae had many Alaskan adventures living mainly in and working out of Kotzebue. But after leaving Kotzebue to take a trip they discovered on their return journey that their house had burned down, killing a friend inside who was watching over it. They also lost their dog in the fire. They never returned to Kotzebue.

John was offered a new position at the Kenai National Moose Range; Assistant Manager in charge of oil activities, but soon thereafter he became refuge manager. Oil had just been discovered on the "Moose Range" the previous year and the search for additional oil and the development of an oil field on the refuge was well underway with apparent minimal regard about the refuge's environment. Because there were few environmental laws and explicit guidelines to address oil development on the refuge in those early days, this was one of, if not the most, difficult period in the management of the refuge. Bulldozers pushed straight lines through the forest to make hundreds of miles of seismic trails as they explored for oil. Drill pads, pipelines and gravel pits were being constructed to support oil development. John was under incredible national, state, and local pressure to allow, as he perceived it, exploration and development on the refuge with a minimum of refuge "interference" or concern for refuge wildlife and its habitat. But John was reluctant to abdicate his responsibility as refuge manager for "protecting the natural breeding and feeding range of the giant Kenai moose on the Kenai Peninsula, Alaska..." as written in the executive order signed by President Roosevelt. Then the Secretary of the Interior paid John a "special" visit in attempt to resolve the controversies. Frustrated with the lack of support to protect the refuge and with his father seriously ill in Michigan, he was offered the manager's position at the Seney National Wildlife Refuge in Michigan which he accepted and where he and Mae remained from 1963 to 1967.

John could not, however, resist the yearning to again return to Alaska. He accepted a position with the U.S. Fish and Wildlife Service to supervise construction activities at the Atomic Energy Commission's bomb testing range on Amchitka Island in the Aleutian Islands chain. The base he once flew out of during World War II was also part of the then Aleutian Islands Refuge where three underground nuclear bombs were to be tested. After a brief stay in the Aleutians, he was again under pressure and as John

put it, he was “reshuffled” back to the Kenai National Moose Range where he remained as refuge manager from 1968 to 1972. But again, under constant stress coping with development on the refuge, John finally retired.

The John Hakala that I came to know had a firm and unbending conviction to try to protect the refuge the best he could. Refuge managers have difficult jobs. They must constantly balance opposing demands and uses on refuge lands, balancing national mandates against local demands. Some user or special interest group always seem upset over decisions of the refuge manager. Some interest groups gain the favour of powerful politicians who then put pressure on managers or their supervisors.

John was caught up in many of these refuge management controversies. Although he apparently could be stubborn and uncompromising, I believe that many of his decisions were based on his memory of how pristine the Kenai National Moose Range appeared to him during his first flight over it in 1942 only a year after it was established. It bothered him greatly to

see that pristine environment suddenly assaulted and as refuge manager he tried to protect the refuge the best he could. To allow environmentally damaging development, to compromise merely to reduce political controversy were against his principles. But despite those difficult years he never gave up loving the Kenai Peninsula and Alaska. Those who knew John will always remember his loud booming voice, his unique sense of humour and his deep belly laughs. While living in Soldotna he never forgot his Finnish background or his close Finnish friends and he seldom missed the Lutheran church’s annual lutefisk dinner. His ashes will be mingled with those of his wife Mae and be spread at a special place they both loved. May he finally rest in peace.

Ted Bailey is a retired Kenai National Wildlife Refuge wildlife biologist who has lived on the Kenai Peninsula for over 29 years. He is an adjunct instructor at the Kenai Peninsula College and maintains a keen interest in the Kenai Peninsula’s wildlife and natural history. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

What do homeschoolers, movies, snowshoeing and the Arctic Winter Games have in common?

by Michelle Ostrowski

Many of us, myself included, had high hopes of a winter full of powder for skiing, snowshoeing, and snow machining. Unfortunately 2006 has yet to bring us an abundance of the cold, white, fluffy stuff. Even though the Refuge is still currently closed to snowmachining, and cross-country ski conditions aren't optimal, there is still a lot going on at the Kenai National Wildlife Refuge Headquarters in Soldotna.

This year the Refuge will be hosting snowshoe events for the Arctic Winter Games. The 2.5K, 5K, 7.5K and 10K male and female junior and juvenile races will be held on the headquarters ski trails March 6-10. Seven of the nine contingents have registered for the different snowshoe races. Being a recreational snowshoer, I was interested in finding out more about this event, and I discovered some of the unusual regulations participants must follow. All participants must wear mukluks or moccasins instead of shoes or boots. They also must make their own snowshoes prior to the race. The snowshoes need to weigh at least 2.5 lbs and have a wooden frame with leather or gut webbing. The snowshoe's bindings must be made of soft leather, hide or lampwick and no devices can be affixed to the snowshoes for traction. Duct tape isn't permitted. I hope you find time to come up to the Refuge Visitor Center on Ski Hill Road and watch some of these races during the Games.

For those families who would prefer their entertainment indoors amidst the warmth, we have our normally scheduled weekend movies. We also have a new Winter Explorer program for ages four to nine. Using the visitor center exhibits as references, "explorers" complete a worksheet and then get a keepsake button.

As many of you already know, we opened the

doors to the new Environmental Education Center in fall of 2005. All of our school field trips are now based out of this log cabin. We are almost completely booked for our Wildlife in Winter and Winter Ecology school snowshoeing field trips for grades four through six.

Besides our organized school field trips we have created an exciting new discovery room program for homeschool families. On February 1-3 (Wednesday, Thursday and Friday) we will have the "Warming up to Winter" discovery room set up for homeschool families with children at the K-6 level. Homeschoolers can drop in on any of these days between the hours of 10:00am and 2:00pm. Activities, games, hands on science experiments, and craft projects will be set up for different age levels on various topics including: animal tracks, water properties, snowflakes, winter adaptations, Inuit vocabulary and more.

Any teachers interested in our organized school field trips (there are still a few dates available between February 15 and March 2) or homeschool families interested in our discovery room program February 1-3 are asked to contact Nicole Johnson at 260-2839.

So what do homeschoolers, weekend movies, snowshoeing and the Arctic Winter Games have in common? They are all just a few of the exciting programs and events that are occurring this winter on the top of Ski Hill Road at the Kenai National Wildlife Refuge headquarters in Soldotna.

Michelle Ostrowski is an interpretive park ranger at the Refuge and has assisted with educational school groups since 1997. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Invasive plants lack natural enemies but may also have chemical weapons

by Ed Berg

I usually make a trip to Naples, Florida a couple of times a year to visit my father. In the 30 years I have been making these pilgrimages to south Florida, I have watched the human population marching across the countryside with endless residential golf course subdivisions and shopping malls. Hopefully global warming will not bring such abundance to Alaska.

In Florida, humans aren't the only invasive species; every ecosystem has its exotic invader. Many of the waterways are clogged with water thyme (*Hydrilla*), which was introduced as an aquarium plant in the late 1950s. The melaleuca tree—originally introduced in 1906 from Australia as an ornamental—was distributed aerially in the 1930s to dry up wetlands. It now grows in impenetrable dog-hair stands (with as many as 31,000 trees and saplings per acre) on thousands square miles of former wetlands.

Similarly, the tall willowy Australian pine (*Casuarina*) was introduced in the late 1800s for windbreaks and shade, but it now saturates coastal beaches above the high tide line. In shrub and forest communities the Brazilian pepper (*Schinus*)—an attractive shrub with bright red berries—must continually be cut back to keep it from completely crowding out native shrub species. It was originally imported in the 1840s as an ornamental from South America.

Successful invasives, be they plants, bugs, or birds, are often thought to lack natural enemies in their new environments. Importers of tropical plants, for example, are not about to import the bugs that would eat their plants. Similarly, the bird flu H5N1 virus is a very successful invader because humans don't have any antibodies for this virus. This explanation is convincing when organisms have obvious enemies, but on the flip side, it seems to imply that native organisms are in fact held in check by their own native enemies. But is this always the case?

I find it remarkable that native plants and animals the world over live in fairly stable population densities. This obvious fact only strikes you when you visit a place like Florida or Hawaii and see what happens when outsiders have arrived who don't play by the

same rules as the locals.

So what then are the "rules" that normally keep native populations in check? What is the "invisible hand" that keeps a natural balance among the players? Is it a simple matter of each player having its local enemies? On the Kenai, for example, why doesn't white spruce, alder, cow parsnip, or bluejoint grass cover every square inch of dry ground? Each of these species is very competitive, and can locally exclude most other species, at least temporarily.

I think that disturbance—not enemies—is the primary reason that none of these players ever wins completely. Disturbance is the great equalizer of ecosystems that ultimately keeps life in dynamic balance. On the southern Kenai spruce bark beetles thin the white/Lutz spruce forests every 50 to 100 years, as do forest fires at intervals of 400 to 600 years. In the central and northern Kenai, forest fires are more frequent, especially in the lowland black spruce forests which burn every 80 years or so. Windstorms, floods and landslides provide more localized disturbances.

Without these disturbances, the landscape would in a few centuries converge to pure white/Lutz spruce in the uplands and pure black spruce in the lowlands. We would see few moose and snowshoe hares (and fewer still of the predators which eat moose and snowshoe hares), because moose and snowshoe hares depend on fire-generated early succession vegetation like birch, willows, and aspen.

With plants, however, there are other factors besides disturbance that control plant distribution on the landscape. Disturbance resets the clock periodically, but lifestyle factors like shade tolerance, growth rate and size determine who wins the competitive race to dominance after a disturbance event. Shade-tolerant spruce trees are the winners in our forests because they can grow up in the shade of faster growing but shade-intolerant species like grass and hardwoods; spruce trees ultimately overtop these species and shade them out, just as the slow moving tortoise overtakes the speedy hare.

Spruce also has some chemical weaponry to de-

fend its dominance, probably phenolic compounds in the needles. You may have noticed that very few plant species grow on the forest floor in a spruce forest. Gardeners know well that most domestic flowers and vegetables simply won't grow in spruce soil, especially without heavy liming to neutralize the acidity of spruce litter. From a biodiversity point of view, a spruce forest is a desert, and spruce has no doubt evolved its chemical defenses to keep it that way. The technical term for such chemical defenses is "allelopathy." The most famous example of allelopathy is black walnut—very few plants can grow under a black walnut tree because of a chemical called "jugalone," exuded by the black walnut foliage. Jugalone acts as an herbicide on would-be competitors, and spruce has analogous herbicides.

When an exotic invasive plant arrives, it can bring its own special chemical weaponry that the native plants have never seen before and for which they have evolved no immunity. Two of south Florida's nasty exotics—melaleuca and Brazilian pepper—are known to use allelopathy to inhibit their competitors. A nasty recent invasive in Alaska—spotted knapweed (*Cen-*

taurea maculosa)—brings a chemical weapon called "racemic catechin," which is exuded by the roots. This toxin quite effectively kills the roots of native plants and gives spotted knapweed a very competitive edge; it has heavily impacted millions of acres of rangeland in the northwestern U.S. and Canada. Back on its home turf in Europe the native plants are immune to this root toxin and spotted knapweed is not such a problem.

In short, there is more to the success of exotic invasives than lack of natural enemies: invasives often bring special characteristics, such as allelopathic chemicals that make them super-competitive against naïve natives. Likewise, there are many factors besides natural enemies that keep native organisms in some kind of dynamic balance, such as disturbance and the ability to outlast one's competitors through shade tolerance, long lifespans, and—again—allelopathic chemistry.

Ed Berg has been the ecologist at the Kenai National Wildlife Refuge since 1993. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Kenai Peninsula owls are in the market for a good clean home

by Todd Eskelin



Photo of Owl. USFWS/Todd Eskelin

Last night with the moon poking through a somewhat hazy sky, I went for a walk to stretch my legs after a hard day riding my computer around the office. It was a perfectly still night, yet warmed by the moist southern air that recently flooded south-central Alaska. After grabbing my gloves from the truck I headed down the driveway. In the distance I heard a fast steady beeping tone, spawning from the mature spruce stand that dominates the area behind our property. The sound was not dissimilar from the annoying beep my truck makes when I leave the headlights on. But, this was undoubtedly the call of a Boreal Owl drifting across the lowlands.

Though it seems like we are still well in the throes of winter, spring is actually right around the corner. Kenai Peninsula owl species can be heard calling any time of the year, but I often hear Great Horned and Bo-

real Owls starting up their courting duets toward the end of February. Who knows, maybe Punxatawney Phil is not in tune with global warming and Ollie the owl knows we are actually in for an early spring. Let's hope! Whatever the case, owls on the Kenai often nest long before the snow has completely left the ground. Many will be sitting on eggs by mid-April and many will begin nesting in March. With a 32-day period from eggs to hatchlings there will be some ravenously hungry chicks in the nest towards the end of May or early June. The cycles of nature always amaze me. About the same time I start seeing the first batch of young red-backed voles emerging from their dens and wandering around in search of food, there will be many hungry owl mouths to feed.

The sound of that owl calling reminded me that if I had hopes of getting my owl boxes up in time to entice any residents this year, the time is now. Courting Boreal Owls will often call back and forth for days or even weeks at a time, but in the darkness they are also searching, testing, and locating the perfect nesting spot. Since both Boreal and Northern Saw-whet Owls are cavity nesters, they are relatively easy to coax into a man made nesting cavity. Bob Dittrick, an owl researcher in Anchorage, has over 100 owl boxes that he monitors and has noted Boreals nesting as early as Valentine's Day.

Over the years, Dittrick has tracked the diets of Boreal and Saw-whets from the remains left at the boxes. These tiny predators prefer red-backed voles, but have taken everything from snowshoe hares to little brown bats. Imagine this 4.5- to 6-oz owl, silently swooping on prey that is seven times its size. That would be like you or me hunting a young moose with our bare hands. If you would like the opportunity to follow the life histories of a Boreal or Saw-whet Owl, take a little time this weekend and build an owl box. Maybe you will be rewarded with the opportunity to see one of these stealthy hunters searching for voles in your back yard.

So, if you are up for building your own owl box, it is fairly cheap and simple. The materials cost about

\$15 and it is a fabulous opportunity to get the kids out in the garage working on a project with you. Basically, the box should be seven to nine inches square on the bottom and 15 to 20 inches high along the front face. The roof should be sloped down towards the front with an eve extending over the entrance hole. Then the three-inch entrance hole should be positioned 12 to 15 inches from the bottom. Remember to make the roof hinged, as it is important to clean out the old nest debris annually. This keeps the birds from being infested with parasites. Some birds have been known to reject old used nests, so this annual cleaning may keep your occupancy rates up.

Placement of the box is almost more important than the box itself. Birds are not going to use the box if it is easily seen from your house. Put it back in a place that has a mix of large spruce and aspen or birch. The birds will often prefer a nest box placed a minimum of 10 feet off the ground and higher if possible. It should be very well secured to a larger aspen or birch. Not only is this preferred by the owls, but it may help re-

duce the number of squirrels that try to nest there. The local birding group recently held an owl building party and made 11 beautiful nest boxes in a short afternoon. For more information on how they did it or upcoming bird-related activities, contact Ken Marlow (262-5218). For a more detailed description of owl box dimensions and proper placement refer to the following links:

<http://www.mindspring.com/~owlman/birdingmagazine.pdf> or <http://www.50birds.com/MPb071614-212-412.htm>

Good luck with your owl box building and please contact me with any successful occupancy. We would love to visit your site and maybe even band any nestlings that are produced.

Todd Eskelin is a Biological Technician that has worked at the Refuge since 2001. He specializes in bird studies and has worked throughout the state on various bird related projects. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Rare birds reappear

by Robin West

Somewhat like the legendary phoenix, the long-lived mystical bird that burned to death, later rise from the ashes, so too the recent rediscovery of the ivory-billed woodpecker has the makings for good story telling for years to come. My old worn bird book from college days, copyrighted in 1966, listed the ivory-billed woodpecker (*Campephilus principalis*) as on the verge of extinction “last reported in deep forests of southeast Texas, central Louisiana, northwest Florida, and South Carolina.” In fact, this rare bird had not been confirmed to exist for 61 years until a recent sighting on Cache River National Wildlife Refuge in Arkansas.

Cache River is just one of 544 national wildlife refuges across the country dedicated to the conservation of fish and wildlife. It is aptly suited to deal with the new challenges sure to face managers in restoring this “lost” species. Established in 1986, with nearly 75% of the acquisition money coming from birders and hunters who purchased Federal Duck Stamps, Cache River Refuge provides protection for a variety of wildlife species while also offering programs for hunting, fishing, wildlife observation, and photography. Approximately 5,000 acres of the Refuge will have limited access to help protect the woodpecker, while 55,000 acres will remain open for public use. Somewhat concerned that people may flock from around the globe to the Refuge for a chance to spot the rare bird, the protected area where the bird was found was placed off limits, but observation areas have been established on adjacent State and Federal lands.

Many will look at the rediscovery of the bird as a wonder—a second chance to try and preserve a unique part of our natural world. Others will likely look upon it with concern or even disdain—another odd creature to be placed under the protection of the Endangered Species Act that seemingly we as humans have gotten along pretty well without. Such values in a way speak to who we are as a society—vastly polarized, neither view clearly right or wrong. Largely, however, the general future management decisions have already been made for the ivory-billed woodpecker. The U.S. Fish and Wildlife Service, with legal mandates and moral resolve, and with the help of many agency and private partners, will work hard to see to the recovery of the woodpecker. Many of us may

never see the bird in the wild, recovered or not. We can, however, listen to it right now. You can log onto <http://www.fws.gov/cacheriver/> to listen to an audio recording of the ivory-billed woodpecker.

Here in the North Country we have a bird with a similar history as the ivory-billed woodpecker. It is the eskimo curlew. Thought to possibly be extinct on and off over recent years, none-the-less the eskimo curlew seems to persist, with possible sightings in at least 30 of the last 86 years. The curlew is alleged to be one of the birds that helped guide Columbus to the New World five centuries ago, at a time, like the passenger pigeon, that the bird probably existed in the “millions.” It is assumed that what eskimo curlews still may exist make their annual migrations from the remote breeding grounds on Arctic tundra to somewhere in South America. Most of the reported sightings since 1945 have come from likely migration and staging areas in Texas—all have come from North America except one in Barbados in 1963 and one in Guatemala in 1977. The exact breeding areas of the birds have yet to be discovered; historically they bred throughout the far North, including Alaska, while the current focus looking for the birds is in Arctic Canada.

How much time and money should people today invest in trying to save animals that were unknowingly put at risk by our ancestors, be it through market hunting or long-term habitat conversion, or the development of pesticides? Such questions have no absolute answers. We have no obvious responsibility to try to fix the mistakes of the past, yet much may be said about our generation in the future by what we try to save and pass on. Ivory-billed woodpeckers and eskimo curlews are creatures for which stories are made. They have demonstrated their unwillingness to disappear from the Earth quickly and without a struggle. I don’t know what their future holds, but all things being equal, I for one hope they win their fight to survive.

Robin West is the Refuge Manager for Kenai National Wildlife Refuge. Prior to his current position, Robin served as the Migratory Bird Coordinator for the U.S. Fish and Wildlife Service in Alaska. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Hidden Lake ice fishing adventure

by Chis Johnson

I am going to tell a story on myself in the hopes that it may educate others and maybe save someone from going in the drink.

Last March we had been experiencing a warming spell for several weeks. The snow was leaving fast; most of the lakes on the Kenai Peninsula were snow free and had standing water on the ice. I was on patrol in the area of Hidden Lake about an hour or so before dark. Hidden Lake is located in the central Kenai Peninsula off of Skilak Loop Road within the Kenai National Wildlife Refuge. The Lake is approximately 2000 acres and has a developed campground on the south end of the lake. The fishing on Hidden Lake is primarily known for the good-sized lake trout and kokanee.

I spotted a group of fisherman with whom I had had previous encounters regarding illegal methods of fishing, i.e., using live fish for bait and using too many fishing lines. In Alaska it is illegal to use live fish for bait while sport fishing in fresh water. This is to prevent introduction of non-native species of fish and fish diseases into our lakes and rivers. It is also illegal to use sport-caught fish for bait, dead or alive, although the head, tail, fins and viscera of legally caught sport fish can be so used. For ice fishing only two lines may be used through the ice. Additional lines may be used for fishing for pike and burbot in some waters, but not on Hidden Lake.

I set up surveillance on the suspects in the campground. I could see that they were preparing to go ice fishing, as they were loading ice fishing poles and an auger into the back of a truck. They loaded up and headed north on the lake. The ice on the lake was about two feet thick in most places. Six inches of strong ice will support a passenger vehicle and eight inches is the recommended thickness to support a pick-up truck. I followed on foot, sticking to cover along the lake shore so my surveillance would not be compromised.

Approximately a mile down the lake I located a tip-up set up. A tip-up is an ice fishing device that is designed to sit over the top of a hole in the ice. It has a base that sits over the hole and a spool of fishing line dropped through the hole. A flag is attached to the spool so that when a fish takes the bait, the flag pops

up and alerts the fishermen that they have a bite. The suspect fishermen were a couple miles further down the lake. I pulled up the line on the tip-up and found a live fish hooked in the back for bait. I dropped the line back into the hole and set the tip-up back up. I then hid in the woods near the tip-up to wait for the suspects to return to the tip-up.

Right at dusk the suspects' truck stops at the tip-up and one of the guys starts pulling up the line. I jump out of my hiding spot and identify myself as "Game Warden" and tell them that they are busted. As I said before, these guys were known to me. They proceed to tell me that the tip-up is not theirs but another guy's that is known to use live bait on occasion. I asked them why they were pulling up the tip-up then. They told me they did not like the other guy cheating, and they were going to mess with his line. I told them that it was illegal to mess with other peoples' fishing or hunting activities.

It was dark by now and I could see a set of headlights towards the north end of the lake headed towards our location. I told the guys to get going, and I would catch up to them later. I dropped the tip-up line back in the water, and hid along the shore again. About ten minutes later, a second truck stops and the driver gets out of the truck and starts pulling up the line on the tip-up. I again jump out and identify myself as "Game Warden" and tell him that he is busted. The guy who I am also acquainted with tells me that the tip-up isn't his but that it belongs to the first guy that pulled up the tip-up. He does not know that I had talked to the other guy. He finally admits that the tip-up is his, and I give him a ticket for using live bait.

We then all head back to the campground. I pretend to leave, but continue my surveillance of the suspects, unknown to them. A short time later I watch both suspects head back out on the lake. This time I decide to follow them in my truck with the lights off so they didn't know that I am following them. It's pitch dark and difficult to see with the naked eye. I am driving with a night vision monocular and can see fairly well. I spot both suspects at different locations on the lake and decide to contact the vehicle farthest to the south on the lake.

I am focusing on the suspect vehicle down the lake and forget where I am on the lake. I know that there are some areas on the lake that tend to have thin ice, particularly areas where there are dark-colored rocks just under the surface of the water. You probably know what happened next. I hit one of those areas of thin ice. I knew immediately what I did. I waited a few seconds for the vehicle to stabilize. I grabbed a flashlight and looked out the open driver's side window. I could see three or four feet of open water.

I crawled to the passenger side and found that the running boards were flush with the ice. I tested the ice, and found it strong enough to support my weight. I got out of the vehicle and surveyed the situation I was in. My truck was approximately 100 yards from shore. The body of the truck was supported on a large rock. All four tires were over open water. Under the front tires was a steep drop off about 20 or more feet. I emptied my truck out in case the truck went in farther and walked back to the campground, where another

officer met me and gave me a ride home.

The next day I gathered up equipment and help. One of our maintenance men Al O'Guinn, my boss Jim Hall and I headed out to Hidden Lake to retrieve my patrol truck. On the way I received a call on my cell phone from one of the guys to whom I had written the ticket for using live bait. I thought he was going to gloat over me sticking my truck in the lake, adding insult to injury. He asked me if I had sunk my truck in the lake. I told him that I had, and I was headed out to retrieve it. He asked me if I could take a look at his truck too; he had sunk his truck that same night in a different part of the lake. With a little thought, some hard work and a lot of prayer we were able to retrieve both vehicles.

Chris Johnson is the Supervisory Law Enforcement Officer at the Kenai National Wildlife Refuge and has been an Officer at the Refuge for 17 years. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Muskrat Winter Olympics: endurance under the ice

by Ted Bailey

I noticed while watching the 20th Winter Olympics at Turin, Italy that the winning times of speed skating events were separated by mere hundredths of seconds. For example, only 0.09 seconds separated Gold Medal winner Enrico Fabris from Silver Medal winner Shani Davis in the 1500-meter event.

An interesting article entitled “Endurance in Speed Skating: The Development of World Records” by Gerard H. Kuper and Elmer Sterken was published in the *European Journal of Operational Research* in 2003 (Volume 148: 293–301). The authors developed a model that predicted a maximum skating speed of 37.9 feet per second for men and that in the foreseeable future the world record would only increase by about 30 seconds for the 10,000-meter speed skating event. Their model’s prediction and the actual Olympic world record for that event at Salt Lake in 2002 differed by only 0.0025 seconds!

One reason that such records do not decrease indefinitely is because of physiological limits set by the human body. Sprint events like the 500-meter speed skating event are dominated by the body’s anaerobic metabolism, while the endurance events like the 10,000-meter event is dominated by aerobic metabolism. Anaerobic metabolism means “without oxygen,” it occurs when the body’s demand for oxygen exceeds the rate of supply and the body relies on stored reserves. Anaerobic metabolism produces toxic waste products like lactic acid that can painfully accumulate in the muscles and blood.

Aerobic metabolism, on the other hand, is metabolism that uses oxygen already stored in the blood or oxygen taken up by breathing; aerobic metabolism does not produce painful lactic acid. So what does all of this have to do with muskrats?

When I walk on the ice of peninsula lakes in the winter I sometimes realize that air-breathing muskrats may be swimming under the ice and that our northern muskrats must forage for food under the ice each day throughout the long and dark winters that may last up to six months or more. The same physiological factors that limit a human speed skater’s endurance on top the ice limit muskrat endurance under the ice. Researchers have discovered that most mammalian and

avian divers maintain aerobic dive schedules in order to avoid build-up of painful and toxic lactic acid in their muscles and blood. This means that the distance muskrats can forage for food underwater may be primarily constrained by their aerobic endurance, not by their anaerobic endurance.

Dr. Robert A. MacArthur with the University of Manitoba, Canada is probably the world’s expert on muskrat diving endurance. In his numerous studies of muskrats in laboratory experiments and in the wild, he determined that the average under-ice swimming speed of muskrats was 2.5 feet per second with a maximum of 4.2 feet per second. Interestingly this speed is similar to the submerged swimming speeds of diving ducks. Muskrats store most of the oxygen they utilize during submerged swimming in their blood. Both the density of red blood cells per unit volume and the size of red blood cells increased from summer to winter, giving them a 17-second winter advantage or 42.6 feet gain for under-ice foraging distance.

MacArthur also determined that the maximum aerobic dive limits for muskrats was about 57.9 seconds. But because their lungs are only about 50% inflated during dives and only about 80% of the oxygen in their blood is actually utilized, their practical dive limit is reduced to 49 seconds. Using 49 seconds one could calculate that muskrats could forage for food a maximum 123 to 206 feet underneath the ice from the air-filled chambers of their bank dens or lodges, without beginning a painful build-up of lactic acid. If, however, they have to return to their den while still holding their breath, these distances would be cut in half for a foraging radius of about 62 to 103 feet.

To extend their foraging distances, muskrats in some habitats gnaw holes through the ice and push up submerged vegetation through the holes to form a little protective shelter, or a “push up”, where they can sit, breathe air and feed in safety from predators. MacArthur measured the distances between muskrat dens and pushups on top the ice. Pushups located offshore from island bank dens averaged 104 feet from the nearest shelter while those within stands of emergent vegetation averaged only 49.5 feet. Because these measured distances were within the aerobic-dive

limit endurance of muskrats, it demonstrates that most muskrats are limited to forage distances under the ice that are determined by their body's oxygen storage capacity.

Nevertheless, muskrats are capable of and have occasionally been measured exceeding their aerobic dive limits by remaining submerged longer or by travelling greater distances under the ice. One way muskrats can extend their foraging range if they cannot build "pushups" is to scavenge oxygen from previously expelled air from bubbles trapped underneath

the ice. Muskrats therefore adapt physiologically and behaviourally to increase their endurance under the ice, not to win winter Olympic medals but to find enough food to survive the long northern winters.

Ted Bailey is a retired Kenai National Wildlife Refuge wildlife biologist who has lived on the Kenai Peninsula for over 29 years. He is an adjunct instructor at the Kenai Peninsula College and maintains a keen interest in the Kenai Peninsula's wildlife and natural history. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

McKay's Bunting makes extremely rare appearance on Kenai

by Todd Eskelin



Photo of a Rare McKay's Bunting near the mouth of the Kenai River. Todd Eskelin/USFWS.

While Peninsula residents have been focused on international visitors from throughout the Arctic region, other visitors have slipped in relatively unnoticed. Chunky white birds that also reside in the Arctic region have made an extremely rare appearance on the Kenai River Flats; three McKay's Buntings have been spotted at the end of Cannery Road, feeding on seeds among the dunes near the mouth of the Kenai River.

It all started on Monday the 27th of February. I checked the messages on the Central Peninsula Bird Hotline and there was a report over the weekend of two male McKay's Buntings mixed with a flock of 200-300 Snow Buntings. Toby Burke, a biological technician at the Refuge had been down at the beach with his kids and spotted the birds as they flew over and landed on the Kenai Flats. What a phenomenal sighting! The total world population of McKay's Bunting is estimated between 2500 and 6000 birds. I immediately went down to see if they were still around. Armed with scopes, cameras, and three different bird books, I launched my expedition.

I have chased a lot of rare bird sightings in the past with very limited success, so my expectations were low that they would even still be on the Kenai. After

a five minute search I spotted a huge group of Snow Buntings, and Toby was right on. I counted 350 in the group I was watching. I moved closer and closer and right in front of me, no more than 35 yards away were two beautiful male McKay's Buntings. With not a stitch of color on their backs, there was no doubt in my mind they were McKay's.

The last tell tale sign I needed to confirm that these birds were McKay's was to see the wing tips. Snow Buntings have relatively large black wingtips while McKay's have very small amounts of black in the wingtips. I followed the flock for 20 minutes and then a passing eagle spooked them and they all flew. It was as if three light bulbs were suddenly turned on in the night. There flying across the flats in front of me were three bright white male McKay's Buntings mixed with a large group of Snow Buntings. The birds were so lightly colored that it was like I was watching a FOX NHL hockey game when they digitally illuminate the puck.

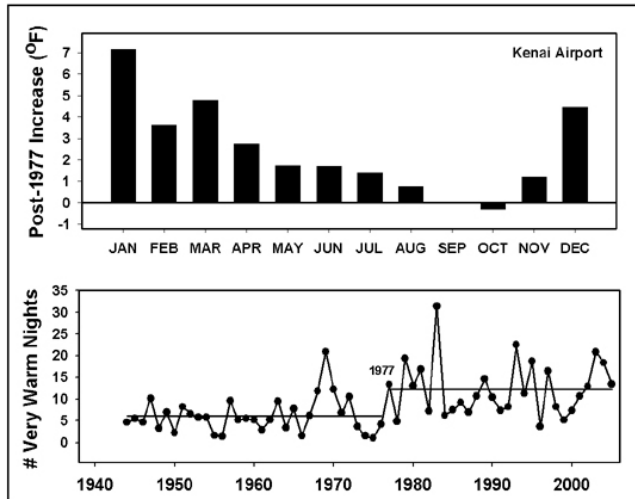
These birds only breed on St. Matthew's and Hall Islands in the Bering Sea. Their winter range is up and down the western Alaska coast, but with only a few thousand birds in the population, they are never reported in any great numbers. If you get a chance to look for these birds, this may be one of the rarest endemic breeding birds you will ever see in Alaska. This species is not as rare as an Ivory-billed Woodpecker, no doubt, but it is certainly rarer than the Northern Spotted Owl. Outside of western Alaska and the Aleutians, there are probably less than 20 sightings of this species anywhere in the world.

Pack your binos, a camera, field guides, and a thermos of hot beverage and spend some time searching for a McKay's Bunting. You will feel quite rewarded if you are able to find one. Don't forget to report your findings to the Central Peninsula Bird Hotline at 262-2300.

Todd Eskelin is a Biological Technician at the Kenai National Wildlife Refuge. He specializes in birds and has conducted research on songbirds in many areas of the state. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Warmer winters and warmer nights a mixed blessing

by Ed Berg



Upper graph shows changes in average monthly temperatures since 1977. Average January and December temperatures have warmed much more dramatically than have summer temperatures. Lower graph shows the number of nights with temperatures in the top 10th percentile. Straight lines shows averages. Most of the increase in very warm nights has occurred since 1977. (Kenai airport data; chart by Ed Berg)

Climatologists tell us that the Earth is warming up. We see lots of evidence of this warming in Alaska with melting permafrost, retreating glaciers, and a shrinking polar ice pack.

I have recently acquired a powerful software package that analyzes daily temperature and precipitation data; it focuses on extreme weather events using maximum and minimum daily temperatures. In the past I have used monthly averages for analyzing Kenai Peninsula climate data. Monthly averages tend to hide extreme temperature events—the scorches and the two-dog nights. I have now obtained the daily data for the Kenai airport since 1944 and the Homer airport since 1932. With this new data and software, I am turning the climate microscope from low-power to high-power.

Climate can potentially warm in many ways, and these different ways have practical consequences. If only summers warmed, but winters stayed cold, glaciers would continue to melt but our heating bills

would remain the same. Conversely, if only winters warmed, glaciers would not melt (or might even increase due to increased snowfall), and our heating bills would shrink.

So, how is the Kenai warming? Basically, all months are warming but winters are warming about three times as much as summers. Unfortunately, due to higher fuel prices, our heating bills are still going up, even though winter fuel consumption should be going down. The temperatures in many parts of the world warmed quite dramatically starting in 1977. In Alaska we usually attribute this climate warming to a sharp rise in North Pacific sea surface temperatures (which seriously reduced the shrimp fishery and boosted Gulf of Alaska salmon). But the warming was actually a worldwide warming that shows up in climate records over most of the Earth.

The upper graph shows the change in average monthly temperatures before and after 1977. December and January increased by 5 and 7°F, respectively whereas the summer average only picked about 2°F, as measured at the Kenai airport.

I made this pre- and post-1977 calculation using monthly averages, i.e., the low-power microscope. Let's now turn to the high-power, and look at the daily maximum and minimums. The lower graph shows that nighttime (minimum temperatures) are warming; the average number of very warm nights (in the top 10th percentile) has increased six to 12 per year after 1977. This is a worldwide trend, and it would be surprising if the Kenai was an exception. Here's how it works.

If the sun were shining brighter, it would heat up the daytime, just like putting more wood on a fire or turning up the furnace. But daytime warming probably wouldn't carry over to the nighttime. At night the Earth is losing heat and there is no sunshine to replace it.

Keeping warm at night requires good insulation. The atmosphere is the Earth's insulating blanket. Warmer nighttime mean the Earth's atmosphere is becoming a better blanket. This is where the "greenhouse" gases come into play, especially water and carbon dioxide. Water in the form of clouds is the most potent greenhouse gas. Everyone knows that a cloudy

winter night will be much warmer than a clear night, because of increased water vapor on the atmosphere. Nevertheless, satellite-based cloud studies show that for the whole Earth, clouds actually cool the atmosphere slightly because their blocking of solar radiation during daytime more than offsets their insulative effect during nighttime.

Furthermore, a recent study analyzed 2223 weather stations around the world, and found that nighttimes are warmer in every season: winter, spring, summer and fall. If increased cloudiness were the main factor, we would expect to see seasonal differences in nighttime warming, because many areas of the world have strong seasonal differences in cloud cover.

In short, the warmer nights appear to be due to increased carbon dioxide and, to a lesser extent, increased methane, nitrous oxides, and other minor greenhouse gases. Fossil fuel consumption is, of course, the primary source of elevated levels of carbon dioxide, followed by deforestation and burning in the tropics.

Personally, if the Earth is getting warmer, I would prefer to have warmer days for the sake of ecosystem stability, although I certainly wouldn't mind the lower heating bill associated with warmer nights. For most organisms, warmer days won't have a great impact; warmer nights on the other hand will be much more biologically significant. Nighttime is the coldest part of the 24-hour cycle: it is the thermal bottleneck. Relaxing this bottleneck should make winter easier on warm-blooded animals like moose and resident birds, but it can also make it possible for lots of exotic organisms—both animal and plant—to establish here that are less cold hardy than our present species.

Many cold-blooded organisms have fairly sharp temperature thresholds of lower (and upper) temperatures where they die. Spruce bark beetle larvae, for example, die at -40°F . In the Yukon winter nights at -40 can knock the beetle population down substantially the following spring, according to my Canadian colleagues. Minimum temperatures rarely get to -40 on the Kenai, so warmer winters are probably not going to influence bark beetle winter survival. With bark beetles it's the warmer summers (both days and nights) that really count, especially when a summer is warm enough for them to complete their normal 2-year life cycle in 1 year.

Domestic plants are a good example of organisms with clear lower temperature thresholds of win-

ter mortality. In Homer, for example, apple trees have been growing so well in recent years that we now have a Lower Peninsula Fruit Growers Association. I suspect that such a development would not be possible without eliminating the killing extreme temperatures of the coldest winter nights.

It seems fairly obvious that making the coldest winter nights substantially warmer would make life easier for just about every kind of organism. What is not so obvious is the effect of warmer nights during the rest of the year and in warmer climates. In the Philippines, for example, a recent study attributed reduced rice productivity to warmer nights; rice yield declined by 10% for each 1°C increase in growing-season minimum (nighttime) temperature in the dry season, whereas the effect of maximum (daytime) temperature on crop yield was insignificant. Similar reductions have been observed in the U.S. with corn and soybeans.

Why would warmer nights reduce crop yields? During the day plants are using photosynthesis to make food for themselves. Like animals, plants are at all times burning up this food—day and night. At night however plants are only burning up food; on a warmer night they burn up more food than on a cool night. This consumption process—called “dark respiration”—competes with the process of growth; if a plant is kept completely in the dark, dark respiration wins and the plant burns up all its food and dies.

The reduction of crop yields could be another unpleasant consequence of global warming. Theoretical models forecast a 16% reduction in yield for corn, sorghum and soybeans in the central U.S. from a 3°C (5°F) rise in mean daily temperature. Much of this reduction would be due to increased dark respiration during warmer nights, but increased daytime drought stress could also be important.

How would warmer nights affect birds, insects, and other animals during the non-winter part of the year—what we call “summer” in Alaska? This is indeed an interesting question to ponder; probably most biologists have never asked this question because it hasn't been on their radar screen. It certainly never occurred to me before I began looking at this temperature data. For now I'll offer a few conjectures and revisit this topic in a future article when I have more information in hand.

Warmer nighttime temperatures will probably allow most animals to be more active at night; plant-eating animals will have more time to forage and they

should grow better, but predators too can be more active, so there is more of a chance that the prey will get eaten. There will no doubt be winners and losers as this balance shifts, and it's hard to say how things will shake out. Personally I will bet on the predators.

Stream temperatures normally drop by a few degrees during the night; this nighttime cooling can keep fish healthy. Sue Mauger, a stream ecologist with Cook Inlet Keeper, recently reported that in 2005 the waters of Deep Creek, Stariski Creek, and the Ninilchik and Anchor Rivers each had more than 80 days when daytime temperatures exceeded the State-recommended limit of 55°F for salmon spawning. Too many warm water days can cause fungal diseases in fish and reduce the availability of nutrients and oxygen.

Fish breathe by using their gills to extract dis-

solved oxygen from water. Warm water holds less dissolved oxygen than cold water, and warm water—in both lakes and streams—encourages algae and phytoplankton growth, which further soaks up dissolved oxygen. These warm water problems are not specific to nighttime temperatures, but night is the time when streams recover from daytime highs, and warmer nighttime air temperatures may impede this recovery.

Warmer winters and warmer nights have their virtues, especially for those of us with old cars and old bones, but they may bring some changes we could just as well do without.

Ed Berg has been the ecologist at the Kenai National Wildlife Refuge since 1993. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Wildlife hotline needs your call!

by Rick Ernst



Photo of biologist Rick Ernst stands beside the sign announcing the new wildlife crossing study area and its' hotline. USFWS

You may have noticed the new “High Wildlife Crossing Area” and milepost signs along the Sterling Highway through the refuge when you are driving east of Sterling. The Alaska Department of Transportation and Public Facilities plans to reconstruct the Sterling Highway between milepost 58 (east entrance to Skilak Lake Road) and milepost 79 (start of the four-lane in Sterling). Most of this 21-mile section of highway runs through the Kenai National Wildlife Refuge or as many of the locals still refer to it—the Moose Range.

This section of highway is on the State list of high moose-vehicle collision zones. An inter-agency group is working to make the new roadway safer for both motorists and wildlife. The group includes representatives of the Alaska Departments of Transportation and Public Facilities, Fish & Game, and Public Safety; Federal Highway Administration; Alaska Moose Federation; and the U.S. Fish and Wildlife Service.

Last October Refuge and Fish & Game biologists captured 30 moose along the highway corridor and attached GPS collars. The collars are white and carry a global position system (GPS) transmitter which records locations every 30 minutes. We hope to get detailed information on where, when, and how often moose are crossing the highway, even if we can't answer the proverbial question: Why did the moose cross the road?

We are also reviewing accident and road kill data from state troopers to pinpoint where most of the wildlife-vehicle collisions are occurring. Reporting in the past was by milepost markers but road-kills will now be recorded more accurately using latitude/longitude from GPS units.

We also hope to find out where animals are successfully crossing the highway without getting hit. We could station observers along the entire 21-mile stretch of road to record animal crossings 24 hours a day, 7 days a week. But the cost would be expensive, not to mention against OSHA or Department of Labor regulations. So we are asking the motoring public who drive this section of the Sterling Highway to report on our “Wildlife Hotline” any sightings of moose or other wildlife on or near the road. We are only asking for sightings between Milepost 58 and 79, i.e., on the section of the Sterling Highway that will be reconstructed. We have added “half-mile posts” to the mile posts along this section to help motorists describe their locations more precisely.

So next time you drive to Cooper Landing, Seward or Anchorage and see wildlife on or along side the Sterling Highway, please call 262-2300. When you call, you will hear a recording that you have reached the Kenai National Wildlife Refuge's bird and wildlife hotline. To report a Sterling Highway wildlife crossing (or observation), press “1” and after the tone leave your sighting information. Press “4” if you would like to hear more details on this study.

The information that we would like motorists to provide is:

- 1) What animal(s) did you see?
- 2) How many animals (for example a cow and calf moose)?
- 3) Between what milepost markers did you see the animal(s)?
- 4) Date and time of the sighting. You are encouraged to leave your name and phone number if you would like a return call.

The Kenai Refuge website will provide a map of the highway corridor with the hotline reports from motorists. Remember, the speed limit on the Sterling Highway is 55 mph. Slow down and save a life—yours

as well as a moose! Thanks for your help!

Rick Ernst has been a wildlife biologist and pilot at the Kenai National Wildlife Refuge since 1993. Previous

Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

“Crystals and Air” “Skiing with Wildlife” “A Refuge for Classic Skiing”

by Dave Kenagy

Here we are again, in late March, winding down the ski and snowshoeing season. While winter is still barely on our minds, let's take a look at cross-country skiing and snowshoeing on the Kenai National Wildlife Refuge ski trails.

First, remember that the Refuge ski trails are on a national wildlife refuge, where wildlife comes first. The main reason you have a refuge in your backyard is to maintain healthy populations of Alaskan wildlife species, by protecting the habitat they depend on.

The Headquarters ski trails are designed and maintained to minimize impacts to wildlife. But, they're also designed so you have a chance to see wildlife, and the birch/spruce forest in which they live. We call this wildlife-dependent recreation.

The ski trails are wide enough for classic cross-country skiing, but not quite wide enough for good skate skiing. The trails are groomed for classic skiing so you have a chance to ski a little slower, look around a bit more, and maybe see wildlife or evidence of it's passing.

Skiers report seeing coyotes, moose, red squirrels, eagles, ravens, woodpeckers, as well as the occasional tracks of wolves and late and early-season bears.

In addition to skiers, we also have a good number of snowshoers who use the trails. An increasing number of people have asked if they could snowshoe on the trails. So, in 2003 and 2004, we allowed snowshoers on a small portion of the ski trails.

We found that most snowshoes cause minimal damage to groomed trails. So, this year (2005) we permitted snowshoers on all ski trails.

My advice to you, should you decide to take up snowshoeing, is to buy lightweight snowshoes for enjoying groomed ski trails. They will easily support your weight on a groomed trail and are less tiring than the larger sizes.

Except for icy conditions, you don't need metal claws. And, unfortunately, large metal ice claws damage groomed trails. If you have snowshoes with large metal ice claws, please do the skiers a favor and walk on the sides of the trails.

A well-groomed ski trail has a delicate surface, and is easily damaged by foot traffic. Even so, we've set aside an area where winter hikers can roam around, too. This is the Keen-Eye Nature Trail Area.

A groomed ski trail passes through this area, but only a short length of ski trail affected by winter hikers. Because the trail is close to Refuge Headquarters, it's easy for us to groom it more frequently. So, if you're a winter hiker, check out the Keen-Eye Nature Trail Area, and maintain a "keen-eye" for wildlife.

I said that our trails aren't wide enough for skate skiing. Most aren't. But, there is one wonderful exception—Headquarters Lake. We groom the lake route wide enough for skate skiing. If you skate ski on the lake, even though you're going fast, keep your eyes open for wildlife and spectacular scenery.

Now you know what we do. How do we do it? First, meet your groomers—Dave Kenagy and Scott Slavik. We are Refuge trails rangers. In the summer we work with dirt; in the winter we work with snow.

Grooming ski trails is art, craft, and a little science. The two major components we work are snowflakes and air (or ice crystals and air).

There are basically four types of snow we deal with; new snow and old snow; wet snow and dry snow.

When we have new dry snow our first objective is to remove most of the air from the mixture, and break down the snowflakes into tiny ice crystals. The best way to do that is with a roller, which we don't have. The second best method, if snow is not too deep, is to use a drag, which we also do not have.

We simply use the track of our super-wide-track snowmachine to pack down the snow, followed by a weighted, "corrugated" pad attached to our renovator/groomer, to further compress the ice crystals.

When we're done, we have a several inch thick upper base layer of compressed ice crystals and air. Most of this base layer is very delicate. Footprints will damage it, but skis and snowshoes have enough flotation to leave the layer intact.

On top of this upper base layer, our renovator/groomer spreads a thin layer of loose ice crystals.

It is the surface ice crystals that allow you to ski classic cross-country, with grip and glide.

When skiing, the tiny surface ice crystals briefly dig into your cross-country ski wax or pack into the waxless pattern on the bottom of your skis for grip, then release and briefly melt for glide. The melting occurs in all but extremely cold temperatures.

The melted crystals are transformed to an ice layer over time, as skier after skier glides down the trail. Icy ski trails generally reduce the grip of cross-country skis, and the icy surface also makes turning and manoeuvring more difficult.

We can renovate the surface after skiers have made it icy. As long as temperatures are below freezing, and the upper base layer of snow is “dry,” renovation is easy. We have an excellent grooming tool that is made to do this very job.

The tool, which we pull with our snowmachine, is called a “Ginzu Groomer” by its manufacturer. It consists of a tubular metal frame to which spring-loaded, hardened steel tines are attached. The tines can be raised or lowered with an electric motor.

The tines break up the upper base layer, churn the mixture, add air, bring tiny sharp ice crystals to the surface, and smooth and compress the mixture back down with a weighted, corrugated, pad. And, voilà—we have a nice new base to ski on.

However, we can’t renovate forever. The tiny ice crystals in the upper base layer lose their sharpness over time. So, the more times we have to renovate without new snow, the poorer the final result.

There’s nothing better than new, dry snow for a nicely groomed ski trail.

When we have very wet snow, whether new or old, we do nothing. Any grooming or working of the snow will remove too much air from the mixture and result in an icy surface and upper base layer when temperatures drop and the mixture re-freezes.

However, if temperatures drop well below freezing in the evening, soft wet snow will quickly begin to re-crystallize, and grooming may be possible at night. We have sometimes groomed after dark to renovate trails.

We generally groom during the day, providing temperatures are cold enough. The trails do not set up as well as when we groom late in the evening, after skiers have gone home, but the result is entirely satisfactory.

That’s basically how we do the job of grooming at Kenai National Wildlife Refuge. If you skied or snowshoed the trails this past season we hope you had a good time, and saw wintertime wildlife.

We have a few summer upgrade plans for the trails to make skiing more fun and pleasurable. If have any ideas or suggestions for the Refuge ski trail system, please let us know. We may be able to complete the changes in time for next winter’s ski season.

Happy ski trails to you!

Dave Kenagy is the Refuge volunteer coordinator, and a trails ranger, who likes working with snow more than he likes working with dirt. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Another wildland fire season is fast approaching

by Doug Newbould

I was looking out my window early this week, contemplating the gray skies and all of the snow piled up in my yard, and watching the water dripping from the eaves. Breakup can be rather dreary if you ask me. Winter does not seem to want to release its grip on the Kenai. But the telltale signs of spring are also visible. The woodpeckers are back and there are a few more songbirds at the feeder than there were two weeks ago. The doggy footprints on the linoleum are no longer just wet, and the buds on the birch and alder have that plump, ready-to-burst look.

Despite the lingering symptoms of winter, I know that another fire season is almost upon us. The seasonal firefighters are coming on board, taking their fireline safety refresher training and getting ready for the physical fitness test, preparing the engines, pumps and saws for that first fire call. And this is the time of year when the prognosticators are making their predictions about the kind of fire season we're going to have in 2006.

Prognosticators can be classified in three groups: scientists, professionals and laymen (or laywomen). Yesterday I pulled up the National Wildland Fire Outlook from the National Interagency Fire Center (NIFC)—Predictive Services Group, on the web. These are the professional prognosticators. They predict, "Fire potential is expected to be significantly higher than normal across most of the Southwest, the south half of Southern California, and portions of Texas, Oklahoma, Florida, Missouri and Alaska for the following reasons:" And the reason they include Alaska in their list is: "A forecasted warm spring and an earlier than normal snowmelt will contribute to elevated fire potential in Alaska."

In their geographic area discussions, the NIFC folks talk about the elevated fire potential in the interior of Alaska "based on below normal precipitation to date and warmer than normal temperatures leading to an early snowmelt. The Kenai Peninsula has significant areas of bug-killed spruce and continues to be an area of concern with higher than normal fire potential."

They basically made the same statement about the Kenai last year, attributing increased fire potential to our hazard fuels problem and low snow pack. And yes,

I guess we can say the professionals got it right last year—at least partially. We had our most significant fire season since 1969. What they did not predict was the lightning we experienced. And to be fair, I don't know how they could have. We have no record of such a lightning season on the Kenai. They also didn't predict Alaska would see its third highest acreage burned total last year.

I also read a news article last month quoting a member of the scientific community, Dr. Glenn Juday from UAF. His prognostication is that Alaska will experience another warm dry summer and increased potential for wildfire. His prediction was based upon the sunspot cycle and its effects upon global weather.

As for the lay community, I have heard very little predicting this year. We had very little snow through most of the winter, then a significant amount of moisture in late February and March. What will April bring? I heard from one of my fellow Fire Management Officers yesterday that the La Nina in the equatorial Pacific would change our weather pattern from what we experienced last year.

So what is my prediction for the 2006 fire season on the western Kenai? After almost fifteen years here, I can honestly say, I have no idea! What I have learned is that we fire managers have to be ready for anything. Every year is unique and even though there are predictable cycles in nature, the Alaskan climate seems to be changing beyond the capabilities of our brave prognosticators.

While I have your attention, I would like to invite you to a couple of events this month. The first is a public meeting, tonight (April 7th) at 7:00 pm at the Kenai River Center on Funny River Road, across from the Soldotna Airport. This meeting, hosted by the Kenai National Wildlife Refuge, is to discuss proposed prescribed fire projects on the refuge.

A second event is a new opportunity for Peninsula residents to get Fire Corps training. Fire Corps is a member of the Citizen Corps family of programs that provide individuals and communities training and support in emergency preparedness and response. The training is free, from 9:00 am to 1:00 pm at the Kenai River Center on Saturday, April 15th. I hope to see you

at both events, and let's get ready for another fire season, whatever it will be.

Doug Newbould has lived and worked on the Kenai Peninsula since 1991 and has been the Fire Management

Officer at the Kenai National Wildlife Refuge since 1999. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Volunteers are increasingly important as budget decline

by Bill Kent



Volunteers Dana Hornyak and Mari Rice. USFWS/Candace Ward

Last week Kenai Peninsula public radio stations conducted their spring membership drive. While listener membership and support is vital to these stations, without volunteers contributing their time, there would be no public radio station beaming non-commercial programming to Kenai Peninsula communities. I took some vacation time last week to volunteer for the drive, and operated the control board for a few hours and answered phones each day over the four-day drive at the station in Kenai. I am also a volunteer host of a music program once or twice a month, and usually participate in the semi-annual clean up of a stretch of the Spur Highway that the station has adopted. While it is probably not obvious at first glance, I believe there are many similarities in the operations of that radio station and Kenai National Wildlife Refuge.

For the most part, our Refuge operating budget consists of appropriated funds authorized by Congress and the President. Funds from outside the legislative process, such as grants from non-government organizations like the National Wildlife Foundation, are infrequent and usually only provide matching funds or part of a project cost. In recent years, our basic operational expenses have risen substantially with fuel and utility costs, along with the cost of supplies, materials and equipment. Funds from Congress have decreased

significantly at the same time, so we are continually re-examining and modifying our priorities. As a result, we and other government agencies are increasingly relying on volunteers to help keep public lands and facilities operating, just as public radio stations are increasingly relying on volunteers for a variety of operations.

Refuge volunteers help in a wide variety of ways: conducting interpretive and environmental education programs, cleaning outhouses, assisting with biological projects, helping with cabin maintenance and construction, trail maintenance, and many, many more activities that keep Refuge programs and facilities operating.

Did you know, for example, that the hosts at Hidden Lake and Upper Skilak campgrounds are typically not Alaska residents, but are volunteers up from the Lower-48 for the summer? We have repeatedly tried to recruit Alaska residents for these campground host positions without success. Usually, Alaskans tell us they do not want to be “tied down” for the entire summer, and are willing to volunteer only for a few weeks. That is understandable—taking full advantage of Alaska summers offers is addictive. However, if fuel costs continue to rise, I am not sure that we will continue to have Lower-48 volunteers willing to make the long journey to the Kenai Peninsula to host at our campgrounds. If that happens, we may have to re-evaluate and possibly change our current policy on campground hosts.

The Kenai Refuge is not the only facility which has tried to increase its volunteer numbers in recent years. The National Park Service, U.S. Forest Service, and Alaska State Parks have all attempted to recruit additional volunteers as budgets decrease and visitor demands increase. We are hoping that the large number of “baby boomers” nearing retirement will provide a new and invigorated pool of volunteers in the near future. After all, volunteering is a great way to make a worthwhile contribution and meet interesting people in the process.

Bill Kent has been the Supervisory Park Ranger at Kenai Refuge since April, 1991. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

What “Seis” are your lines?

by Jason Ray

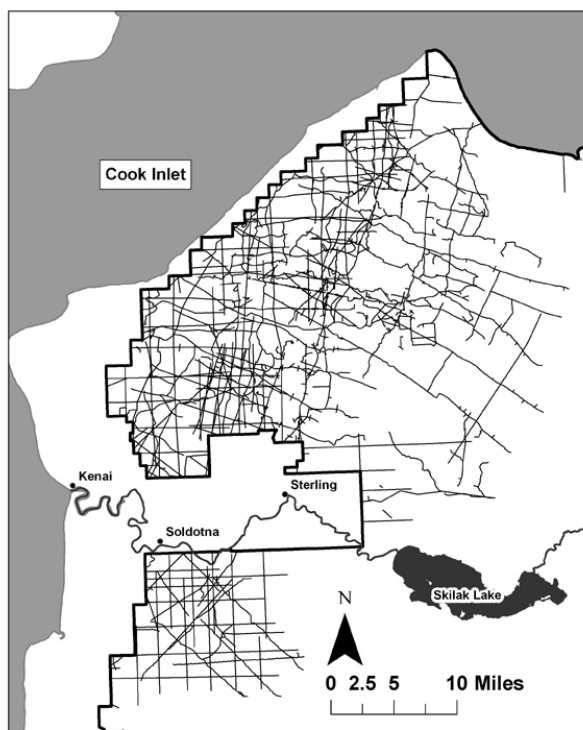


Image map of seismic lines cut for oil and gas exploration from 1950s to 1980s. USFWS/Jason Ray.

I like to drive. I like to get out and explore open roads. I almost get whiplash every time I zoom by a new trail or opening in the forest. “Where does that path lead?” I think to myself. Sometimes I can drive down the trail; sometimes I have to get out and walk. Either way, I am going down the trail to find out where it goes. Most of the time however, I don’t stop to think why that trail is here. If it goes to a certain place the answer is obvious, but what about the trail that ends in the middle of the woods at a seemingly random spot? Back home in Colorado, I usually assume that the trail served as a logging road, but, on the Kenai National Wildlife Refuge, a dead-end trail is more likely a reminder of oil and gas exploration in years gone by.

In the 1950s, oil companies began speculating about oil on refuge lands (then known as the Kenai National Moose Range). This speculation paid off for the

Richfield Oil Corporation in 1957, when they drilled a well that produced commercial quantities of oil near the Swanson River.

The importance of this discovery was many-fold for Alaska and the Kenai. While small amounts of oil had been previously found in Alaska, this was the first big strike. The revenue from Kenai oil helped Alaska make the push for statehood. The oil strike also attracted numerous oil companies to the area for more seismic exploration.

Seismic exploration uses sound waves to map the underlying layers which can trap pockets of oil. Microphones (called geophones) are strung out thousands of feet from a shot point, where an explosive blast or a mechanical vibrator creates sound waves which are reflected off the underlying layers, like radar waves.

Early seismic surveys made straight cuts (seis lines) across the countryside with a bulldozer, so that electrical cables could be stretched from one geophone to the next. Usually the bulldozer work was done in the winter when the ground was frozen.

In the competitive frenzy to find new oil, much of the early exploration was done without any regard for clean-up or restoration of the damaged landscape.

Fortunately, as time passed, exploration technology improved, refuge policies tightened up, and seismic exploration became less invasive. Nevertheless, evidence of old seismic lines still marks the refuge. There are approximately 1,850 miles of seismic lines on the refuge, concentrated primarily on the northern half. Not all the lines represent bulldozed trails, but each line represents some kind of disturbance to the landscape.

Many of the seismic lines have melted away into the landscape as the vegetation has regrown. However, some of the lines have persisted as trails which have provided the public with the opportunity to access areas of the refuge that were previously inaccessible. The seis lines have indeed opened a whole new world for curious people like me to explore. From the human point of view, the seis lines are great because they provide access to areas and wildlife that would otherwise be beyond the reach of the ordinary mortal

hiker or hunter.

The refuge is a great place for people to recreate and to interact with wildlife, but, recreation is only a secondary purpose for the refuge. Foremost, the refuge is protected habitat for the peninsula's diverse wildlife. Whether seismic lines and other trails on the refuge are good or bad for the wildlife probably depends on the species, the time of year, and any number of other variables. For example, on a recent trip, I saw plenty of evidence of moose using the trail I was on, but on the same trip, I was responsible for displacing a moose as I made my way down the trail. Both predators and prey can be found on the trails, and there are

advantages and disadvantages for both kinds of critters.

Regardless of their source or impact, trails are more or less permanent fixtures on the refuge landscape, and over time refuge management has learned to be very cautious about opening up new trails on this landscape.

Jason Ray is an intern at the Kenai National Wildlife Refuge. His internship has focused on documenting seismic trails for the Refuge's computerized Geographic Information System (GIS) database. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

What does the Kenai National Wildlife Refuge have to offer youth this summer? Youth Conservation Corps Positions

by Tai Davis

Each summer the Kenai National Wildlife Refuge hires high school students for the Youth Conservation Corps (YCC) to work on a variety of projects on the refuge. The work is physically demanding, has lots of camaraderie, and makes lots of very worthwhile improvements that might not otherwise get done. Here is what we tell new applicants about the YCC program.

You will be part of a team that will learn and earn together. Yes, you'll get paid to learn, specifically, \$7.75 per hour. You'll accomplish needed conservation work on public lands and develop an understanding and appreciation of the Nation's natural environment and heritage. There will be opportunities to interact with other teens from different social, economic, ethnic, and racial backgrounds.

The first week will be orientation and training. Uniforms will be issued, (steel-toed boots, hard hats, safety glasses, leather gloves, and long-sleeved shirts to wear for work). Training will cover bear safety, tool safety, CPR/First Aid, boat and cold water safety, and a swim test, where you will have to swim for 100 yards at a local pool. Job Hazard Analysis forms will be filled out for each job and enrollees will be reminded daily of safe work procedures.

The work itself often requires lifting and carrying objects, like rocks and logs. Hand tools will be used. The crew works outside in all weather conditions. It's possible to encounter wildlife. Oh, did I mention the insects? There will be times you will be working around bodies of shallow to deep cold water. Expect rugged environments. Projects could consist of trail rehabilitation, campground cabin maintenance, and maintaining any other facilities that need attention.

Last summer the team completed several work projects, three of which were spent at spike camps. The first spike camp project was making the Upper Ohmer Lake cabin more handicap-accessible by widening the path to a handicap ramp behind the cabin. The second spike camp did maintenance work on the Nurses and Caribou Island public use cabins.

The third spike camp was at the Moose Research Center, where the crew painted feeding boxes, piled old brush, tore down old feeding boxes and gates, and removed brush from a half-mile of fencing.

Other projects included trail restoration, where sawdust or gravel was used to improve the trail surface. Benches that were too high for people to sit on were lowered. Boardwalks and landscape islands were maintained. Outhouse doors were repainted. Signs that direct visitors to refuge facilities and traffic signs were maintained. The refuge headquarters building was scraped and painted, and some interior walls repainted. At the Environmental Education building, landscaping logs were put around the garden, the garden was weeded, and gravel was spread.

What will the Refuge expect from you: You should work cooperatively, be respectful of yourself and others, keep a positive attitude, show up to work on time, be ready to work, understand your assignments—and if you do not understand, ask questions—and take care of all equipment issued to you. Last but not least, be safe, have fun, and get in shape.

Crew supervisors are responsible for the well-being of all crew members. The supervisors coordinate work projects, assist other Refuge staff with projects as needed, and ensure a safe, enjoyable, unforgettable summer for each crew member.

I had a chance to hang out with the participants last summer; they were a great group of kids. It was cool going shopping with them. They picked all the right snacks/meals for their spike camps. I was even invited to go out to the campsite with them. (I think it was because I bought the food for them.) They were proud of their accomplishments. They worked really hard and did a superior job!

Participants' names will be selected by a random drawing. Employment will be June 12 to August 4. Once selected, you must be able to work the full 8-week period. Selected applicants will be notified by phone by May 5. Any applicant not selected will be notified by letter.

If for some reason you did not apply this year or were not selected, don't be discouraged. You can apply next summer, if you are age 18 or under.

Tai Davis will be experiencing her second summer in

Alaska, working as the permit specialist at the Kenai National Wildlife Refuge, and is still loving Alaska. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Shorebird workshop aims to improve your identification skills

by Todd Eskelin

Finally, after what seems like an endless winter, spring has actually driven the snow from our yards. The greenhouse supplies are flying off the shelves at the local stores, and everyone is uncovering their boats and trying to get those darn trailer lights working before their trip the next morning. As for me, I am dusting off the clubs and preparing for another fabulous season on the golf course.

This is also the time when the avid and enthusiastic bird watchers dig out their optics, start thumbing through their field guides and stare inquisitively at the bird in the back yard. It looks similar to a robin, same size as a robin, but then it makes this funny ringing call that is nothing like what the book describes. Eventually, after a few moments of study the light comes on. The memories are jogged and you belt out “Varied Thrush.” It is almost a euphoric state as you float above everyone in the room with your knowledge.

Your cloud rapidly dissipates when a friend says, “Hey, you know your birds. Lets head down to the Homer Shorebird Festival and watch the shorebird and waterfowl migration.” Horror overwhelms you at the thought of fumbling through the guide looking for a non-descript shorebird. “It is a purple sandpiper,” you proclaim. No, they are only found on the East Coast. “It looks like an Eskimo Curlew.” Guess again, they were last on this planet in 1963. If this is you, I have a proposition for you.

The Kenai National Wildlife Refuge and the Kenai Watershed Forum are sponsoring the second annual shorebird identification workshop. This is a great opportunity for birders of all levels to watch an enlightening presentation on shorebird identification as well as a brief section on using your typical point and shoot

digital camera through a spotting scope to capture pictures of birds up close. The best part is that the entire program is free. The workshop starts with a classroom portion where we discuss the finer points of how to actually identify that short, squatty, long legged, grey bird, with a long bill. After that we will break up into smaller groups and head out to the field with 4 prominent birders from the local area where we can apply some of the skills discussed in the classroom. The program will be on Wednesday May 10th and Saturday May 13th. The programs will be very similar, but there is no guarantee that the same birds will be spotted both days. Attendees are welcome to attend both sessions.

Last year we were able to spot 14 different shorebird species while out on the field trips. With the late migration this year we are hoping to add a couple more species. There are also ample opportunities to ask the experts questions about other groups of birds like waterfowl and songbirds. Please RSVP with Josselyn Burke at the Kenai Watershed Forum if you are interested in attending. Call Josselyn at 260-5449 or email her at josselyn@kenaiwatershed.org.

This is your chance to broaden your skills and ease that helpless feeling you get when the identification of an entire group of birds eludes you. Please remember this program is aimed at birders of all skill levels. We learn through teaching and one is never too old to learn.

Todd Eskelin is a Biological Technician at the Kenai National Wildlife Refuge. He specializes in birds and has conducted research on songbirds in many areas of the state. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Investing in the future of the Kenai National Wildlife Refuge

by Jim Neely

Those of you who are tuned into the latest happenings in the halls of congress know that national security and disaster relief have been on the front burner for some time now. With a large percentage of the nation's tax dollars going to fight the war on terrorism, and recent national and international disaster relief efforts, many natural resource agencies are feeling the financial pinch. "Do more with less" has become the phrase of the day. To ensure that we are prepared to deal with the many needs of the Kenai National Wildlife Refuge (KENWR), in light of diminishing human and financial resources, we need to make some careful investments in the future.

One of the ways we are investing in a bright future is by reaching out to the community for volunteers. Dedicated volunteers can provide the "shot in the arm" that makes a real difference in the quantity and quality of programs and services we provide. Volunteers, by their very nature, bring a wealth of talent and genuine caring. The typical volunteer is someone who already uses the refuge and wants to give something back. That kind of ownership is exactly the value we want to invest in and watch grow. Here is an example of community ownership in action.

Over the last couple weeks we held our annual Spring Clean-Up / Green-Up event. Dedicated volunteers from the local community joined refuge employees in a campaign to pick-up the refuse left-behind by a few not so caring visitors. It is a sad fact that even today, with all the public education and laws meant to curb littering, we must expend time and dollars on this continuing eyesore. Without the help of our volunteers we would have to rob other already lean budgets to accomplish this task.

Students and teachers from Skyview High School and Sterling Elementary, volunteers from the AK DOT Adopt-a-Highway program, Boy Scouts, our KENWR Friends organization, and a number of individual "good neighbors" demonstrated their caring for the refuge by cleaning truckloads of debris from along the Sterling Highway, Funny River Road and public use facilities. We are very thankful for their contribution

and ask that the community will respect their hard work by not littering.

We recognize that the long-range future of the refuge lies in today's youth. The refuge's environmental education program is primarily geared toward investing in that resource with a variety of educational and experiential opportunities for school-aged children. Classroom curricula addressing environmental responsibility, the web of life, and other ecological themes are supplemented by hands-on field trips to bring the lessons home. Partnering with public educators has been the key to success. The refuge invested in a large, handsome environmental education cabin which opened this past year. It is our hope the lessons learned in this new Environmental Education Center will be applied in the students' lives and someday passed on to their children.

Another way we are working to ensure a bright future for the refuge is by investing in tomorrow's hunters. The refuge has a long heritage of hunting and it is important that we continue to invest in that tradition. Participating in the ADF&G Hunter Information and Training Program (H.I.T.), we offer hunter education classes at our Environmental Education Center. Refuge employees, who are certified H.I.T. instructors, work to instill strong ethics and conservation values in their students. It is refreshing to see how motivated some of the students are toward learning about how hunting fits into wildlife resource and land management. The skills these new hunter/conservationists gain from the H.I.T. program will last a lifetime.

Monitoring the whereabouts of wildlife on a two-million acre wildlife refuge is a daunting task. The refuge is soliciting public volunteers to report sightings in one particular area of the refuge, the Sterling Highway. In preparation for the proposed Sterling Highway improvement project, we are collecting data to determine how and where wildlife uses the portion of the refuge adjacent to the highway. This data will be used to develop wildlife crossings and other travel corridor mitigations to ensure the health and safety of our wildlife populations and reduce the potential for

wildlife /vehicle accidents. Including public reporting is a cost effective means of gaining valuable scientific information. If you are travelling the Sterling Highway through the refuge and wish to record your sightings, please call the Wildlife Hotline at 262-2300.

These are but a few examples of how the KENWR is reaching out to our community to accomplish our goals during this period of budgetary uncertainty. We know a bright future depends on the value placed by the community on this wonderful resource. It is our hope that we can encourage many more volunteers to

join in a partnership of joint stewardship.

From those of us who call the KENWR home, a heartfelt thanks to everyone who has stepped up to the plate already. If you haven't joined in yet, what are you waiting for?

If you are interested in learning how you can become involved, please call the refuge at 262-7021.

Jim Neely is a Refuge Law Enforcement officer. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Hunters in the 1890s called for a national wildlife refuge on the Kenai

by Jim Hall

As many readers know, the Kenai National Wildlife Refuge was originally called the Kenai National Moose Range. The Moose Range was established by Executive Order on December 16, 1941 by President Franklin Roosevelt. The land was set aside from unreserved federal lands for the American public in order to protect the giant Kenai moose, and subsequently, to protect and conserve all species of fish & wildlife found here on the majestic Kenai Peninsula. The formation of this conservation effort, however, had a much earlier beginning.

Recently I returned from a 60-day assignment with the Department of the Interior in Washington DC, where I worked with the office of the Assistant Secretary for Fish, Wildlife and Parks. Basically that's the office that provides oversight for everything done by both the U.S. Fish & Wildlife Service and the National Park Service. One of the interesting things I discovered while working in the Main Interior building was the Main Interior Library, which encompasses the 150+ year history of land management by the Department of Interior.

I wish that I had possessed unlimited time to dig through the archives of information located in that huge library, but alas, I was constricted to lunch time, and a couple of afternoons after work. Despite being limited on time, I did find some interesting material, and some of the articles that I found on the history of the Kenai National Wildlife Refuge were very enlightening.

For example, *Outdoor Life* magazine was founded in Colorado in 1898, and catered primarily to Western sportsmen. Almost all issues are available in DC in the Interior Library, and I got the opportunity to look through the "early years" of the conservation movement in North America through the words of sportsmen from the time period. Few people may realize that the conservation movement in North America was largely developed, organized and implemented by sportsmen from the turn of the 20th Century.

President Theodore Roosevelt was listed in several articles from the early years of *Outdoor Life*. Roo-

sevelt went on to create the National Wildlife Refuge System with his establishment of Pelican Island National Wildlife Refuge (Florida) in 1903. Looking back through those early magazines, including *Outdoor Life*, *Forest and Stream*, *Field and Stream*, and *The Pacific Sportsman*, it was very plain where the hearts and pocket books of those early sportsmen were directed.

Although Dall Deweese is the first person on record to call for the establishment of an Alaska Game Preserve (see *Refuge Notebook*, Sept. 21, 2001). The first record I personally located calling for the preservation of land in Alaska came in an article in the March, 1902 edition of *Outdoor Life* by one W.T. Hornaday. Mr. Hornaday's article was titled "National Game Preserve For Alaska," and he proposed a vast game preserve encompassing all of the lands in southern Alaska from Yakutat Bay to the Nushagak River, including the Alaska Peninsula and Kodiak Island (which he spelled Kadiak Island). His verbalized his fear as, "Nature has been millions of years in developing the wonderful animal forms now inhabiting our arctic provinces, but which foolish and short-sighted man is now thoughtlessly exterminating." He went on to say "We of to-day have no right, either moral or legal, to destroy all the zoological resources of nature, and hand over to our grand-children a world destitute of wildlife." I made a copy of this article, and many others of historical note, and they are available to anyone interested.

In that same *Outdoor Life* edition, there was another article by the famous Colorado hunter Dall DeWeese calling for "The Protection of Alaska Game." In his article DeWeese calls for the establishment of game laws, and writes at length of the wildlife he found on the Kenai Peninsula from 1897 until 1901. He also goes on to imply that some irresponsible sportsmen, but primarily market hunters (supplying the mining camps) were decimating the wildlife of the Kenai Peninsula. We know today that this happened as DeWeese described: through the use of poison, wolves were extirpated (locally extinct), and fox were decimated to the point of scarcity. By 1915 cari-

bou were listed as “scarce,” and totally gone from the Kenai Peninsula by 1920 (they were re-stocked in the 1960s and 1980s).

Forty years of debate later, the Kenai National Moose Range was finally established—eighteen years before Alaska reached Statehood. When I hunt the Kenai Mountains and the benchlands of Lake Tustumena, hike the trails along the Skilak Loop Wildlife Recreation Area, and canoe the Swanson River and Swan Lake canoe systems, I marvel as I see the indige-

nous wildlife and spectacular scenery. I am thankful that those who came before us had the wisdom and strength to fight for the greater good; without their efforts we would live in a different (and I believe poorer) World. Especially here on the Kenai.

Jim Hall is the Deputy Refuge Manager for the Kenai National Wildlife Refuge. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

National Trails Day: “experience your outdoors”

by Scott Slavik

Alaskans don't need a reason to “go out and play.” In fact, when most Alaskans are out enjoying their favorite pastime, there are probably more reasons to stay inside. If you have ever gone ice fishing in January, dug clams in early spring, or camped in the rain, you know what I'm talking about. There is, however, a great reason to celebrate in the “outdoors” on June 3rd regardless of the weather or temperature.

National Trails Day is celebrated at thousands of events nationwide on the first Saturday of every June. Events are hosted by local and statewide trail clubs, city, state, and federal public land and health agencies, community groups and other nonprofit organizations and outdoor-minded business. In 2005, celebrations occurred in all 50 states, as well as, in Puerto Rico, Guam, the U.S. Virgin Islands, and Canada.

National Trails Day was originally recognized and continues to be promoted by the American Hiking Society, a national non-profit organization dedicated to establishing, protecting and maintaining America's foot trails. Now, in its 14th year, National Trails Day has grown to inspire nearly a million trail enthusiasts to flock to their favorite trails to celebrate, discover, and learn about trails while attending trail dedications, gear demonstrations, instructional workshops, trail work projects, and educational exhibits.

The goal of National Trails Day is to promote public awareness of and appreciation for trails and the people who build and maintain them. Events are planned and designed to encourage cooperative efforts among various trail users, build partnerships among trail groups, businesses, and public land managers, as well as, promote the health benefits of trails.

To commemorate National Trails Day this year, the Kenai National Wildlife Refuge is giving a guided hike on Lake Emma Trail and a tour of the historical Lake Emma cabin. Lake Emma Trail's remote location and challenging access make it just one gem among many of the refuge's hidden treasures. Lake Emma Trail offers a unique wilderness experience and allows a glimpse of the past as one follows in the footsteps of early hunters and trappers who first explored the area at the turn of the century. The day promises to be a memorable Alaskan adventure with extraordinary

scenery and opportunities for wildlife observation and photography.

Lake Emma Trail was heavily damaged during the Glacier Creek Fire of 2004; however, reconstruction is now mostly complete thanks to a dedicated cadre of refuge staff, youth crews, and volunteers. The re-birth and recovery of this area is well underway as the scorched landscape continues to give-way to fireweed and other pioneer plant species. Unfortunately the Lake Emma guided hike is fully booked, but there are other great opportunities to celebrate National Trails Day both here on the peninsula, as well as, all around the State.

The U.S. Forest Service is hosting a “Kids Fun Day” in Moose Pass which will feature a variety of outdoor activities for the whole family, including a nature hike, craft projects, and healthy snacks. Another opportunity within the Chugach National Forest includes a hike along the north section of the Johnson Pass Trail. The Forest Service has teamed up with the Sierra Club and is looking for volunteers to assist with the installation of a bear-resistant food container. Event planners promise “an informal, fun, family geared event.”

A little farther south, Seward Community Schools is planning an assortment of kids programs, exhibits, workshops, and local music. If you're looking for an opportunity to “get your hands in the dirt” you might consider a road trip to Homer for the weekend. Load up your hand tools and join the Coalition for Homer Open Space and Trails and participate in range of trail maintenance projects around town, as well as across Kachemak Bay.

National Trails Day events are also being planned in Kodiak, Cordova, Thorne Bay, Portage, Barrow, Juneau, and Anchorage. Additional information on these and other National Trail Day events occurring locally, as well as, nationally can be found at www.AmericanHiking.org.

Participating in a National Trails Day event is a great way to show your appreciation for trails and the people who build and maintain them. Without the support of volunteers, land managing agencies, and outdoor-minded businesses our trails would disappear. However, simply enjoying some time “on the

trail” with family, friends, and neighbors is very much in the spirit of the day.

The Kenai Peninsula has a wide variety of trails to choose from regardless of age, interests, skills, or physical abilities. Within a relatively short distance, you can find a trail that accommodates your favorite mode of transportation, whether it is an ATV, snow machine, horse, bicycle, skis, rollerblades or your favorite, well-worn pair of hiking boots.

Trails provide us access to the natural world for exercise, study, photography, camping, relaxing or solitude. Trails are the path to good mental and physical

health by giving us fresh air, getting our hearts pumping, and allowing us the chance to get away from our daily challenges and stresses. The staff at Kenai National Wildlife Refuge encourages everyone to get outside, get active, and experience the wonders of trails in our own “backyard.”

Scott Slavik is a Backcountry Ranger and spends the summer patrolling and maintaining the trails on the Kenai National Wildlife Refuge. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Dandelion Sundae: an opportunity to learn about invasive plant species

by Toby Burke

The exotic or non-native plant persisting in your back yard lawn may not be as benign as you think. It may have the potential to escape and become an invasive plant affecting not only our urban landscape but the larger landscape as well. Accordingly, natural resource agencies and local citizens are becoming increasingly concerned about non-native, invasive plants and the many problems they pose for native flora and fauna and the quality life we residents often take for granted here on the Kenai Peninsula.

While not all non-native plants are necessarily invasive more than a few are and they can cause irreparable harm to an ecosystem and its constituent parts. Invasive plants can adversely alter natural ecological processes. They may be capable of causing major, possibly irreversible, alteration or disruption of these processes by altering geomorphology, hydrology, or fire regimes. They can adversely alter natural community structure by changing the density of a layer of vegetation, creating a new layer, or eliminating one or more layers. They can adversely alter natural community composition resulting in the extirpation of one or more native species, reducing biodiversity or changing the community composition towards species exotic to the natural community. They can adversely alter higher trophic levels impacting animals, fungi, microbes, and other organisms in the community it invades. More specifically they can alter geomorphologic patterns by increasing erosion by thinning or eliminating native plants that once formed a dense layer of roots holding sediments in place. Or conversely they can completely cover sediments that were naturally unvegetated. They can alter hydrological patterns by changing stream flow and sedimentation rates. They can change water chemistry and accelerate the eutrophication of lacustrine waters (lakes and ponds), fluviate waters (streams and rivers), and even marine (coastal) waters. They can change fire regimes by altering fire frequency, severity, and spatial distribution. They can change the entire structure of plant and animal communities. They can extirpate species or populations of species and reduce biodiver-

sity. They can also be unpalatable to domestic livestock and some aquatic invasives can physically clog lakes and streams impeding navigation. The list goes on and on.

The ubiquitous and exotic dandelion, found on the margins of roads, trails, sidewalks, driveways, parking lots, campgrounds, and in lawns has become the “poster child” for invasive plants. Like many invasive plant species they readily colonize disturbed areas and can often be difficult if not impossible to eradicate once established in the botanical community. This plant is probably the most familiar invasive we have on the Kenai Peninsula, and it can serve to introduce concerned citizens to a larger cadre of invasive plants especially ones likely to be encountered locally.

Thus, on Sunday June 4th, from 1-4 pm, the Kenai National Wildlife Refuge along with the Kenai Watershed Forum and the University of Alaska Fairbanks Cooperative Extension Service will host “Dandelion Sundae” at the Refuge Visitor Center in Soldotna. Come rain or shine and bring a grocery-sized bag of dandelions plants, or just their flowers and seed heads, and any other invasive plants that you can readily identify and remove. Give us your bag of invasives and the general location where they were removed and you will receive a free ice cream sundae.

Prizes will be awarded for the most sensitive removal sites (i.e. streamsides, trailheads etc.), family totals, and most plants with roots intact. Come and listen to informative presentations and receive free invasive plant guides to aid in the future removal and mapping of locations of plants such as Canada and Bull Thistle, Common Tansy, Toadflax, Oxeye Daisy, Narrowleaf Hawksbeard, Orange hawkweed, Hempnettle, Bird Vetch, White Sweetclover and others. Become informed and contribute to the effort to prevent and control the spread of invasive plants in your community and adjacent wildlands. For further event details or recommendations on where to go “weed pulling” contact Kenai National Wildlife Refuge at 262-7021, Josseelyn Burke at the Kenai Watershed Forum 260-5449, or Janice Chumley at the University of Alaska Fairbanks

Cooperative Extension Service 262-5824.

Toby Burke is a biological technician at the Kenai National Wildlife Refuge. He specializes in invasive plant surveys for the refuge and he will be one of the

hosts of Dandelion Sundae. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Blackbird of the bogs: an early victim of global warming?

by Ted Bailey



Photo of a female rusty blackbird/USFWS.

As I walked around the margin of a small pond on the Kenai Refuge in mid-May checking on the seasonal progress of breeding wood frogs, I flushed a jet-black bird feeding along the edge of the water ahead of me. When it landed on a birch sapling nearby and I looked at it closely through my binoculars, its jet-black appearance at a distance had transformed into a beautiful iridescent bluish-green gloss in the reflected sunlight. The iridescence reminded me of the plumage of displaying birds-of-paradise from New Guinea. But I was looking at a male Rusty Blackbird, which is sometimes referred to as the “blackbird of the bogs.” Its duller slate-colored female companion was also nearby but was more secretive. Both sexes of Rusty Blackbirds have conspicuous light-colored eyes resulting from their pale irises. Later in the year their plumage will take on a more brownish appearance from which their name “rusty” is derived.

By coincidence, the next morning in the May 15 edition of *Time magazine* I read an article entitled Bye Bye Birdies where it was written: “The decline of the rusty blackbird, for example—one of the most rapidly dwindling species in North America, says Butcher—may also be due to global warming, but the immediate cause seems to be a drying up of the Canadian wetlands where it breeds.” I had previously known the Rusty Blackbird was in decline but had not realized the significance or rapidity of the decline.

One of the first scientific articles on the decline of Rusty Blackbirds appeared in a 1999 issue of *Con-*

servation Biology magazine. By analyzing past reports and results of North American Breeding Bird Surveys, Christmas Birds Counts and the Quebec Checklists Program the authors were able to document an approximately 90% decline of Rusty Blackbirds over the past 30 years. In contrast to other species of blackbirds in North America—the Red-winged and Brewer’s blackbirds and grackles—that benefited from habitat changes caused by humans, it appears that the Rusty Blackbird declined primarily because of the draining of wooded wetlands in the southern United States where it spends the winters.

In a more recent report entitled *Status Review and Conservation Plan for the Rusty Blackbird (Euphagus carolinus)* in Alaska, written in March 2004 by Kevin Hannah of the Alaska Bird Observatory in Fairbanks, I read that the Rusty Blackbird has been one of the least studied birds in North America over the last 40 years. It is the least studied because of the remoteness and inaccessibility of its breeding range. During the breeding season, Rusty Blackbirds frequent wet forests, bogs, fens, muskeg, beaver ponds, and wet forest openings across the boreal region and favor open habitat near water, with a preference for nesting in tall shrubs. I also learned that Rusty Blackbirds in Alaska appear to be declining at a slower rate than elsewhere where their populations have been monitored.

But now in addition to problems on its winter range, the Rusty Blackbird may also be threatened by shrinking wetlands in its summer breeding range, which is the boreal forest region across northern North America including Alaska. Unlike other blackbirds, breeding Rusty Blackbirds feed primarily on aquatic invertebrates such as the larvae and adults of aquatic insects and snails. Each year I have been fortunate to observe a pair of Rusty Blackbirds that nest near our home. On several recent occasions I watched them feeding in their usual manner by wading in shallow water and flipping over dead leaves looking for aquatic invertebrates. But the Peninsula’s wetlands are declining.

Kenai Refuge ecologist Ed Berg has documented the drying of wetlands on the Kenai Peninsula (See *Refuge Notebook*, September 16, 2005), which appar-

ently began in the late 1960s and accelerated during the 1990s. He attributes the decline of wetlands to warmer summer temperature, which increases evapotranspiration. The drying of wetlands is subtle unless they are visited on an annual basis. For example, one pond that I first surveyed for wood frogs in 1991 held water over 30 inches deep. The size of this pond rapidly shrank during the early 1990s and today the “pond” has numerous white spruce trees growing where it once existed, some of which are over three feet tall. The drying of wetlands in the boreal forest

areas of Alaska and Canada is predicted to have a detrimental effect on many species of wildlife. The Rusty Blackbird may be one of the first noticeable victims of this ecological change.

Ted Bailey is a retired Kenai National Wildlife Refuge wildlife biologist who has lived on the Kenai Peninsula for 30 years. He is an adjunct instructor at the Kenai Peninsula College and maintains a keen interest in the Kenai Peninsula's wildlife and natural history. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Summer programs at Kenai National Wildlife Refuge

by Candace Ward

Refuge Headquarters Programs:

Alaskan wildlife movies are shown daily at noon, 1, 2, 3, & 4 p.m. at the Refuge Visitor Center from June 1 – August 31. Center hours are Monday through Friday, 8 a.m. – 5 p.m. and Saturday & Sunday, 9 a.m. – 5 p.m.

Environmental Education Center summer activities include Jr. Explorer & Trail Explorer Programs. Kids earn cool buttons and prizes while doing self-guided nature activities. Center hours are 10 a.m. – 4 p.m. daily from June 23 through August 13.

Nature Talks will be held at the Environmental Education Center from July 1 to August 12 at 11 a.m., 2 p.m. & 3 p.m. on Thursdays, Fridays, & Saturdays. Talks last 20 minutes and topics include Alaskan wildlife, native culture and history.

Check out a **Discovery Pack** at the Environmental Education Center to explore the **Keen Eye Nature Trail** and learn more about Alaskan birds, wildlife and plants.

To find both centers at Refuge Headquarters, travel south from Soldotna on the Sterling Highway and turn left across from Skyview High School on to Ski Hill Rd. Travel one mile on Ski Hill Rd. to the Visitor Center parking lot. The Visitor Center is adjacent to the parking lot. To go to the Environmental Education Center, take a short walk on the Keen Eye Trail from the Visitor Center parking lot.

Skilak Wildlife Recreation Area Programs:

Hidden Lake Campfire Programs are held on Friday and Saturdays at 8 p.m. and last one hour. Saturday dates are June 17 – August 19 and Friday dates are June 23 – August 18. Programs alternate between a variety of Alaska wildlife and cultural topics.

Hidden Lake Campground is located 3.6 miles from the east entrance of Skilak Lake Rd. Meet at the campground amphitheater. If raining, meet at the picnic pavilion next to the boat ramp. Travel time from Soldotna is approx. one hour.

Discovery Hikes take place Saturdays at 1 p.m. and alternate between Burney's Trail and Vista Trail. These hikes last 1 ½ - 2 hours. Hikers cover up to 1.5 miles round trip. A spectacular view of Hidden or Skilak Lakes awaits you at the end of each hike. Wear comfortable hiking shoes, bring rain gear, and carry water. Please do not bring dogs for these hikes. Travel time from Soldotna is approx. one hour to each hike location.

June 24, July 8, July 22 & August 5 – Meet at the **Burney Trail** in Hidden Lake Campground. Discover nature by experiencing a series of fun activities that use your senses. To find the trail head, travel to Hidden Lake Campground located 3.6 miles from the **east** entrance of Skilak Lake Rd. The trail head is located in the campground across from site #7, Skyview Loop. Park in the picnic area day use parking lot and walk to the trail head.

July 1, July 15, July 29 & August 12 – Meet at the **Vista Trail** in Upper Skilak Campground. Learn about the Hidden Creek Fire of 1996 and how plant and wildlife has returned in ten years since the fire. To find the Vista Trail, go to **west** entrance of Skilak Lake Rd. and travel 10 miles to the turn off to Upper Skilak Campground. Follow the road for two miles to the campground. Park in the picnic area day use parking. Walk to the boat ramp area and take the foot bridge over the creek to the "A" campground loop. The Vista Trail is marked and departs from the "A" loop across from the restrooms.

Whether you watch a wildlife movie or take a Discovery Hike, make sure your summer includes one of the Refuge's fascinating and fun nature programs.

Candace Ward is a park ranger, who leads the Refuge's information and education programs. She works each summer to train and assist new staff in presenting nature programs for the enjoyment of Kenai Peninsula residents and summer visitors. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Signs of Summer: Loon chicks appearing on local lakes

by Liz Jozwiak

Last Sunday on Father's Day, I was lucky enough to get out on Sports Lake to do some leisurely fishing. While most of the others in the boat were on a mission to hook into a Kokanee or a Rainbow trout, my attention wandered off towards watching the violet green swallows that were flying low along the water's edge picking off the mosquitoes and stone flies in their flight path.

I also observed a few Bonaparte's gulls near one of bogs, and a family of mallards with eight chicks feeding along the water's edge. In particular, I was hoping to see if the pair of common loons that usually nests on this lake produced any chicks yet.

Thanks to Nita and Harvey Douthit, who have monitored loons on Sports Lake for several years as part of the Kenai Loon Watch Program, we know that these loons have been successful at nesting and producing at least one chick every year.

While fishing, we never observed the loons on the main portion of the lake. There was quite a bit of boat activity, and with several families out fishing (including ourselves) I was pretty sure the loons were off in the quiet cove behind the peninsula.

As we headed back to the dock, we went slowly past the opening to that little cove, and were rewarded with eyeing one of the adult loons with a chick on its back. I was delighted to get a chance to see this! To minimize any disturbance to the loon family, our boat never created a wake, and we did not go towards the loon we observed.

Other than the nesting period from mid-May to mid-June, now is a very critical time for the young loon chicks and their parents as they can fall prey to predators, or be accidentally run over by motor boats and jet skis. Even birders or photographers can inadvertently disturb loons by approaching them too close with a canoe or kayak.

The Kenai Peninsula and particularly the northern portion of the Kenai National Wildlife Refuge is fortunate to have a healthy population of Common Loons.

Smaller lakes can support only one breeding pair such as on Sports Lake, but larger lakes such as Dolly Varden Lake in the Kenai NWR may have more than one pair with each pair occupying a bay or a section

of the lake. Loons prefer privacy but not necessarily solitude. Loons and humans (at moderate density) can co-exist on lakes provided some undisturbed suitable shoreline or island is available for nesting.

Building their nests close to the water allows the birds to slip directly from the nest to the water. The same nests are often used from one year to the next. However, drastic changes in water levels could cause the nest to fail. High water can flood the nest, or very low water could make the nest inaccessible to the adults. The pair may successfully re-nest should such an event occur.

The nests, made of coarse, decayed vegetable matter, are built on the ground. Sometimes eggs are deposited on a bare depression. Islands give protection from most predators and are the preferred nesting locations. One to three eggs are laid in June, however, two eggs are the most common. The olive brown eggs with irregular dark spots weigh about 160 grams (5.6 oz.). Both parents take turns incubating the eggs, usually for 26 to 31 days until they hatch.

The eggs will hatch within 24 hours of each other. Chicks can swim almost right away. Their brown-black down dries quickly, and the chicks join their parents out on the lake. The chicks will often ride on the backs of their parents to rest, stay warm, and avoid predators such as gulls and bald eagles.

Chicks are fed by their parents until they are about eight weeks of age. After this time the chicks begin to dive for some of their own food. By 11 to 13 weeks of age the young birds can feed themselves and are able to fly. Early in their life chicks are fed small food items including aquatic insects, small fish, and some aquatic vegetation. As they grow they are fed more fish.

Breeding loons need an undisturbed nesting site, and a quiet bay to raise their young. There are several things you can do this summer to help keep Kenai loons healthy and productive:

Human disturbance can be detrimental to loons in many ways: Direct physical interference with nests or young; increased wake from pleasure craft on lakes, which may swamp or destroy nests; loss of habitat caused by lakeshore development; and spills of oil and other pollutants all affect the nesting and rearing suc-

cess of this bird. Yet on many lakes loons have actually adapted quite successfully to some level of disturbance by people.

By observing adults and chicks only from a distance and by not disturbing nests, you can help reduce disturbance to the birds and their young.

You should never chase loons, and you should be careful with fishing tackle-abandoned or unattended fishing line may entangle and injure the birds. Boats should be used cautiously, avoiding high wakes or wash near the lake edge, and some shoreline areas should be left undisturbed to accommodate loon nests.

It is important for nesting loons to be given a wide

berth (200 Ft) when using lakes in May and June, the primary nesting period for loons in Alaska. Chicks developing in eggs left unattended will cool and die. Enjoy loons from a safe distance. If you see a loon rising out of the water running and splashing across the surface, you are too close. If the adult loon has been scared off its nest, the eggs can chill and die, or be eaten by a predator.

Join the Kenai Loon Watch project and become a "Loon Ranger." Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

American Marten: A mammal barometer of global climate change

by Andy Baltensperger

Global climate change is increasingly recognized as a powerful force reshaping the environment in recent decades. Climate change raises many new questions which challenge traditional views of wildlife management, such as how will altered climate affect various wildlife species, how will it change ecosystem functions, and ultimately, how should we manage ecosystems within this constantly shifting climatic framework?

The American marten (*Martes americana*) is one species whose strict physiological requirements in winter make it especially for monitoring for climate warming. Marten are very sensitive to environmental conditions and should be a good indicator species for detecting environmental change. This sensitivity however does not necessarily allow a straight-forward prediction of the marten response to climate change.

On the Kenai Peninsula, marten are most abundant within the denser, wetter forests of the eastern Kenai, and they extend westward along forested drainages through the Kenai Mountains to Skilak Lake. They are not typically found within the black spruce dominated Kenai lowlands where canopy cover is sparse and where snow depths are generally lower than in the Kenai Mountains.

For an animal which traditionally inhabits boreal forests, marten are physiologically rather poorly equipped to deal with winter. Marten have long, slender heat-radiating bodies, poorly insulative fur, low fat reserves, high metabolic requirements, and do not hibernate. All of these factors combine to make survival during cold winters a struggle for marten.

The reason marten have been able to exploit boreal forest habitats so successfully is their ability to seek out thermodynamically efficient resting sites. In winter, because of their physiological vulnerability to cold, marten must rest under an insulating layer of snow in order to stay warm. Pieces of coarse-woody debris (downed trees, logs, stumps, etc) protrude up through the snow and create pockets and tunnels where marten can easily access the subnivean zone (space between the snow surface and ground). In the subnivean zone,

marten rest under the wood, which keeps them dry, while the snow overhead insulates them from cold temperatures outside.

A layer of fresh snow at least eight inches deep is sufficient for maintaining resting site temperatures between approximately 10 and 32°F, even when outside temperatures approach -40°F. This critical depth increases linearly, however, as the snow layer becomes older and denser with thawing and refreezing, which is occurring more frequently during Kenai winters nowadays. If snow depths and densities do not meet insulative thresholds, marten have to capture additional prey simply to stay warm or they will freeze to death. Thermodynamic stress and unavailable prey are both related to inconsistent snow-cover and are probably highly significant factors controlling the distribution of marten on the Kenai.

If snow depths are in fact limiting marten distribution, there are several alternate scenarios which may play out as the climate becomes warmer. Under one scenario, climate warming may actually increase winter snowfall the Kenai, in which case suitable winter marten habitat may expand into the lowlands. On the other hand, despite any potential increase in snowfall, an accompanying increase in winter thawing may destroy the insulative capacity of snow for marten in many areas of the Kenai. A third, long-term scenario involves significant warming to the extent that winter lows no longer fall below 0°C. In this case marten would better optimize their heat conservation by resting above the snow, when it is present. Under such extreme warming conditions (unlikely in the near future), snow cover would cease to be a requirement for marten survival on the Kenai.

There are other factors in addition to snow-cover which should be considered. Marten tend to prefer older, closed-canopy forests, which have more prey, more coarse woody debris, and better protection from predators than do open-canopy forests. On the Kenai Peninsula, mature forests include hemlock, white spruce, Lutz spruce, and Sitka spruce forests, but generally exclude areas of black spruce which tend to

lack a closed canopy. Recent research on the Kenai indicates an upward movement of tree-line at a rate of approximately one meter per year since the 1950s. As closed-canopied forests continue to move upward into areas of alpine tundra, marten habitat should expand upward into higher elevations already having sufficient snow-cover.

Over the next two winters as part of my graduate thesis research, I plan to examine marten distribution patterns and their relationships with average snow depth across the Kenai. My working hypothesis is that marten have been restricted from dispersing into the Kenai lowlands and other areas of suitable habitat by the lack of sufficient snow-cover. A recent study of museum specimens from the Kenai indi-

cates that marten and shrew body sizes have increased slightly in size over the past 100 years, which suggests a positive response to greater food availability due to climate warming.

It will be interesting in the coming decades to monitor exactly how marten populations respond to a host of hanging factors such as snow-depths, temperatures, tree-line, and prey availability as their habitat changes with our warmer climate.

Andy Baltensperger is a graduate student at Colorado State University, currently working on his MS thesis on the Kenai National Wildlife Refuge. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Wet summer may prevent planned prescribed fires on the Refuge

by Doug Newbould

In my last Notebook article I wrote about various predictions for the 2006 fire season in Alaska—more than one of which forecasted another active summer of wildfires. Well, so far, I am happy to say those prognostications appear to be overstated. After the first five days of July, only 200 wildfires have been reported and those fires have burned only 212,113 acres. We have yet to experience any protracted periods of high pressure over the state or any major dry lightning busts like we witnessed during the past two fire seasons.

Of course, it is way too early to say the 2006 fire season is a bust. We may yet find ourselves in the middle of another breakout. The Parks Highway Fire near Nenana (115,500 acres) continues to make news and generate smoke, and there have been a handful of other large fires around the state this year. But all in all, it's been an easy fire season, and I for one—am glad. The last two years, back-to-back, produced more fires and blackened more acres than any other two consecutive years in the Alaska record book.

I have enjoyed the respite from wildfire this year on the Kenai: more time for family and friends, more time for fishing, and more time for pecking away at that honey-do list that has threatened to bury me if I don't get busy. Of course there is a downside, at least for my wife. She is seeing entirely too much of me this summer.

The other potential downside of a wet summer is that we may not be able to complete our planned prescribed fire projects on the Refuge. We have just about everything ready to go out at Mystery Creek—to burn two more of the units between the Enstar natural gas pipeline and Mystery Creek Road. Both units are about five miles north of the Sterling Highway and fifteen miles east-northeast of Sterling. We plan to ignite Unit 3 (2120 acres) first, and then Unit 2 (1000 acres) after Unit 3 cools down. But unless the ground fuels (duff, litter and moss) dry out more we will not be able to meet our approved burn plan objectives (remove/reduce black spruce hazard fuels and expose mineral soils for hardwood regeneration).

So, although more wet weather means more fishing time for me, it also means I won't get my Refuge honey-do list done. We have successfully burned three of the Mystery Creek Units since I came to the Kenai NWR in late 1997, and I know my bosses and perhaps a few moose out in the Mystery Hills would be pleased if I finished off the other three. I guess I'll just continue to watch the weather forecasts and my tide booklet—and see what tomorrow brings.

Doug Newbould has lived and worked on the Kenai Peninsula since 1991 and has been the Fire Management Officer at the Kenai National Wildlife Refuge since 1999. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Skilak Lake birds trying on new colored leg bands

by Todd Eskelin



Photo of Cormorants nesting on Skilak Lake. USFWS/Todd Eskelin

The Double-crested Cormorants at Skilak Lake have come a long way in the last 70 years. That's right; they have been nesting on little islets on the east end of Skilak for at least 70 years!

The earliest published record I have seen describing the cormorants of Skilak Lake was an article in *The Alaska Sportsman* July 1936. While the activities described by H.A. Anderson were quite creative, it should be noted that this would be highly illegal under current regulations. Back in 1936, Mr. Anderson boated from his Caribou Island cabin up the lake to the bird colony and placed his White Leghorn chicken eggs in the cormorant nests. Three weeks later he went back and retrieved the eggs as they were beginning to hatch. Since his chickens were unwilling to incubate the eggs, Mr. Anderson found a way to use wild birds to facilitate the process. Unfortunately, there was no mention of the number of nesting birds in the article. He did describe heavy flea infestations in the nest and did not reproduce his experiment in subsequent years.

The earliest record I can find of the population status of the cormorants at Skilak was a survey done in 1951 and 1952 by David Klein. In 1952 he counted 30 nests, with an average of 3 eggs per nest for an estimated production of 90 eggs. The next recorded survey effort was conducted by the U.S. Fish and Wildlife Ser-

vice from 1982 to 1985. That group of surveyors only had an average of 6.5 nests per year with an average of 20 eggs produced. That is a fairly significant reduction in productivity from 1952 to 1982. We must use caution in interpreting this data and not extrapolate too much from it. It is just a snapshot from 20 and 50 years ago and for all we know, 1952 was just an aberrant high year.

Since those earlier surveys, the Kenai National Wildlife Refuge has been tracking the cormorant colony on a more consistent basis and has documented a steady increase in productivity since the 1980s surveys. The most recent survey in June 2006 recorded 62 nests with a total of 199 eggs produced. With this steady increase we felt it was important to get a more detailed picture of what may be driving the changes we are seeing in the population.

Starting in 2005, we fitted 100 cormorant chicks with colored metal leg bands on the right leg. Each year, for the next 3 years, we will fit the cormorants with different colors for each year. In 2005, the cormorants were all fitted with 3 anodized metal bands. The color for 2006 will be green. With these color-marked birds we will be able to track the incorporation of young birds into the breeding population at approximately age 3 years.

If we continue to see increases in the number of nests, but don't see color marked birds in the breeding population, then we can assume that birds are immigrating into the colony from other areas. Another possibility is that the birds are simply producing more eggs per nest. All of these questions will be answered over the next 3 years and as with all good mysteries, many more puzzling questions will be spawned from the answered questions.

So, if you see any cormorants in the area check the right leg for bright colored jewelry and report your findings to the Refuge. It is interesting to think the cormorants have changed with the times. Seventy years ago they were being used as chicken egg incubators and now they are out sporting the latest in fashion statements.

Todd Eskelin is a Biological Technician at the Kenai National Wildlife Refuge. He specializes in birds and has

conducted research on songbirds in many areas of the state. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

At what cost?

by Jim Neely



Photo taken from the air. USFWS/Jim Neely.

ALASKA. The great outdoors. The last frontier. Teeming waters and abundant wildlife. The chance for that great trophy of a lifetime and the bonus of a full freezer. Sound familiar? Maybe that is precisely what drew you to the 49th state. Sounds great to me, but wait a minute. “What price are you willing to pay to fulfil those dreams?”

Much of Alaska’s dreams are found at the end of an aircraft flight. Many sportsmen hire air taxi operators to transport them to remote sites throughout the state. By and large, most of the air taxi operators are true professionals who do a great job of accessing risk. In fact, I hear enough stories from disappointed hunters about setting on the ground because the pilot wouldn’t fly on a “marginal” day, to know most are flying within their limits. After all, a person can’t keep an air taxi operation in business long if they are bending up planes and passengers on a regular basis.

But how about the private aircraft owner? Federal Aviation Administration records show there are 10,805 active pilots and 9,902 registered aircraft flying in Alaska. Most of these are private pilots with personal aircraft. In 2005, there were 131 aircraft accidents in Alaska. 107 of those accidents, including 8 fatalities, involved general aviation aircraft. To their credit, commercial air carriers had no fatalities.

All pilots are taught to assess risk before each and every flight. It’s a matter of survival. Examine the plane, check the weather, evaluate your piloting

skills, and consider your current mental and physical condition. Then, do it all again just to be sure you haven’t missed anything. So why are we bending up so many aircraft in Alaska in August and September every year? I would suggest it is because we don’t ask ourselves, “At what price?”

Last August I spent a night on the mountain waiting out a party of hunters who decided to play the odds. The party had landed a Super Cub in a closed area of the refuge. After locating the plane from the air, I helicoptered in to wait out the group.

The low-time pilot had landed his Super Cub on a piece of gravel in a deep narrow canyon near the face of a glacier. According to him, he scouted the area a number of times pre-season and located a band of rams. He talked about bringing his girlfriend along on one of the trips and landing in there. After “taking care of business” with the pilot and his two hunting companions, I left with the understanding he would be gone before sunset. I flew back over the area that evening and discovered the pilot’s Super Cub minus the propeller. Once I got him up on the emergency channel, I found out he had put the cub on its nose on his last landing, bending the prop. He and his aircraft mechanic partner were straightening the prop between a couple rocks. I hung around the area for about an hour and watched them climb aboard and take-off after completing their “field-repair.”

Talk about the lack of risk assessment. The funny thing is when I had talked to the young pilot that morning about taking this risk over a sheep, he laughed it off and boasted about his confidence. Seems this wasn’t the first time he had bent up his cub though, as it was wearing a yellow left wing on an otherwise black airframe. When I brought the obvious previous accident to his attention, he explained it as “no big deal.”

I wonder if his girlfriend’s family would have seen it that way if he would have bent it up showing off his superior mountain aviator skills? Besides the fines for illegal aircraft operations, the pilot suffered a 90-day suspension of his aircraft license. Had he killed a sheep and transported it in the Super Cub, he would have been walking to his next hunt. Something to think

about!

The point of this is, I hope before you take-off for the mountains this fall you will ask yourself “At what cost?” I’m not suggesting to park the plane, but I am very much recommending you weigh that desire to go where no man has gone before against the realities that may go along with that decision.

One last comment about preflight planning. Be sure to check on the legality of flight operations along your intended route. Regulations differ among land management agencies. The Kenai National Wildlife Refuge has detailed maps and a pilot’s guide to aircraft operations that is available upon request. Before

flying on the refuge, I highly recommend you give us a call at 907/262-7021, or stop by the Refuge Visitor’s Center, on Ski Hill Road, and pick-up a copy.

Have a safe and enjoyable hunting season and be sure to count the costs when assessing the risks. See you up there!

Jim Neely is a refuge officer with the Kenai National Wildlife Refuge. He lives in Soldotna with his wife Faye and their English Setter Ammo. They enjoy hunting, fishing, flying, and worshipping with friends at the Soldotna Bible Chapel. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

YELLOWJACKETS: Dangerous but Beneficial

by Matthew Bowser

Few insects may be as hard for Alaskans to appreciate as yellowjackets. Unlike bees, they are not efficient pollinators. Even the mosquitoes that harry us relentlessly seem to justify their existence through their role in freshwater aquatic food webs. Yellowjackets seem to exist only as a hazard, especially for the horseman or unwary child who unwittingly stumbles upon a nest.

Yellowjackets sting primarily to defend their nests. In contrast to honeybees, which can sting only once, yellowjackets may sting repeatedly. For most people, this causes sharp localized pain, but an allergic response to a sting can quickly result in a severe allergic reaction and even death. Symptoms of a severe reaction include generalized swelling; confusion; dizziness; nausea; and difficulty breathing, speaking, or swallowing. In such cases medical care should be sought immediately.

While it is true that yellowjackets cause considerable trouble for people in Alaska and much of the world, they serve as important predators. Yellowjackets feed primarily on insects, including many insect pests. Some species also scavenge opportunistically.

Ten species of yellowjackets are known from Alaska, at least several of which live on the Kenai. Here, the two that seem to most commonly interact with man are the Common Yellowjacket (*Vespula vulgaris*) and the Aerial Yellowjacket (*Dolichovespula arenaria*).

The Common Yellowjacket, our most abundant species, forms large colonies in ground nests. They may also build nests within walls of houses. Workers can become nuisances since they scavenge quite readily, partaking of any available fresh meat from moose carcasses to salmon fillets and turkey sandwiches.

Aerial Yellowjackets usually construct nests above ground in shrubs and trees, but they also frequently build nests on man-made structures. These nests can be hazardous due to their close proximity with people. Otherwise, Aerial Yellowjackets tend not to be pests since they seldom scavenge.

Yellowjackets construct paper carton nests made from plant fibers, mostly weathered wood. Workers may be seen on old wooden fences and other wooden

structures chewing on the surface of the wood. Nests consist of stacked, horizontal tiers of vertical cells enclosed in an outer envelope. Both aerial nests and underground nests have this same structure. Ground-nesting yellowjackets excavate the soil around the nest as the colony grows.

When yellowjackets, which are generally beneficial, establish colonies in, on, and around human dwellings or when populations of scavenging species become overly abundant, their control is warranted. The most effective means is to destroy yellowjacket nests, although this can be dangerous. Aerial nests may be attacked using fast-acting insecticides in propellant cans; ground-nesting colonies can be killed by use of a fumigant and plugging the nest entrance. This should be done at night or very early in the morning when the wasps are least active and when the maximum number of workers resides in the nest. Safer methods to reduce yellow jacket populations, such as baited yellowjacket traps and poisoned baits are also available.

In Alaska and most of North America, yellowjacket colonies do not survive the winter. Queens, which are larger than the workers, overwinter in leaf litter. They emerge in the spring and seek out suitable places to build nests. This behavior can be conspicuous as they investigate under the eaves of houses and in recesses. Queens construct small nests and rear the first brood of workers on their own. They hunt for insects, chew them up, and feed them to their larvae. As the workers, which, like honeybees, ants, and other social wasps, are all female, enter the work force of the colony, they quickly take over foraging, brood care, and nest construction responsibilities. At this point the colony begins growing quickly, reaching peak population size in July to August. Queens and males are produced at the end of the season as the colony begins to decline. They leave the nest, mate, and the newly fertilized queens seek out protected places in leaf litter.

Some yellowjacket queens, instead of initiating their own colonies, usurp and assassinate the queens of already established colonies. They take over the colony and the workers rear the assassins' offspring.

There are even species of yellowjackets that do not have workers since they always exploit other colonies in this way. There are also yellowjackets here on the Kenai about which little is known. These have white banding instead of the more typical yellow banding.

Whether we appreciate them or not, these small, brightly colored, predatory animals are an integral part of the Alaskan fauna deserving of at least caution. For those curious about yellowjackets, most can

be easily identified using readily available identification keys on the internet.

Matthew Bowser has served the Kenai National Wildlife Refuge for three years as a biological technician and STEP graduate student. He is currently pursuing an M.S. in biology through the University of Alaska Fairbanks. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Hunter education important to the future of hunting

by Robin West

I reflected this past weekend while teaching a bow hunting education class and preparing for an upcoming basic hunter education class, how important is this stuff, really? I know the statistics—hunter education significantly reduces accidents and makes our sport safer, but does it have other value? I think it does.

Learning to stalk game, becoming proficient with a weapon of choice, taking proper care of harvested game meat, and a myriad of other related skills all take time and practice, and such learning experiences are all part of the enjoyment of hunting, but there are some basic elements of knowledge and abilities that everyone should have before they first go afield.

Traditionally, firearms safety and hunting skills were passed on within families, but increasingly potential new hunters are finding themselves with little or no previous hunting experience within their immediate families. Nationwide the percentage of hunters within the U.S. population has fallen to well below 10%.

Many organizations and agencies have stepped up to provide the necessary information to prospective new hunters and the Alaska Hunter Information and Training (HIT) Program is a good one. This program is administered by the Alaska Department of Fish and Game and includes a variety of activities including basic hunter education, bow hunter education, bear baiting clinics, black powder hunting certification, Becoming an Outdoors Woman (BOW), special shooting events, and more. The HIT Program has a full-time staff, but most of the course instruction is done by volunteers. Organizations such as Safari Club International and The National Wild Turkey Federation are also frequent partners and have donated such things as air rifles and safety vests.

So what do you get if you attend a hunter education class? Well, first of all it is mandatory in some form in all 50 states. Some states require the class for any age of hunter; most require it only for younger hunters. In Alaska there are hunter education requirements for hunting in Game Management Units 7, 13, 14, 15 (Kenai area), and 20 for hunters under age 16 (or older than 16 if born after 1986). There are also education requirements to hunt in certain areas, such as on military installations, and in certain types of hunts

(such as successfully passing the bow hunter education and proficiency test before hunting in a big game hunt limited to the use of archery tackle).

Once a student has passed the Alaska course their certification card is accepted anywhere in the Country for the same activity (basic hunter, bow hunter, muzzleloader). This is one of several good reasons why we see many adults in our classes along with young people.

Firearms safety is the paramount focus of the basic hunter education class, but many other topics are covered, including wildlife identification, conservation and management, outdoors survival, and basic regulations.

One important part of the class addresses ethics—more of the unwritten rules that dictate how we undertake our activities. This is extremely important for the future of hunting because society is primarily made up of non-hunters. While it is true that less than 10% of the population hunts, it is also true that perhaps 10% of the population has strong anti-hunting feelings, leaving the majority of the people in the United States as non-hunters (are neither hunters or anti-hunters). With a democratic form of government, this majority of people (the approximately 80% of the populace) will likely decide the ultimate future of activities such as hunting. They need good scientific information about the management values and legitimate subsistence and recreational values of hunting, but they also need to be left with good perceptions about hunting activities.

Hunting as a sport is hurt when the public views unsafe or rude behavior by hunters. Being polite, leaving a spotless camp, salvaging all game meat, following applicable regulations, respecting the land, not bragging endlessly about your harvest in public places, or displaying knives and guns needlessly in public are some of the things that can help leave the kind of image and impression that helps ensure the future of hunting. Even beyond avoiding negative behaviors, hunters should go out of their way to be the most friendly and helpful folks that others encounter in the woods. This, if you will, is the second form of hunter education: hunters going the extra distance to share information, and perhaps even some game meat, with

non-hunters—working to help not only develop factual information to share, but also to create an environment of support and understanding for an activity in which others may not participate, but are entitled to have an opinion about.

For more information about hunter education programs you can check out www.huntereducation.alaska.gov. You may also sign up for classes locally by

contacting the Alaska Department of Fish and Game at 262-9368

Robin West is the Refuge Manager of Kenai National Wildlife Refuge and has been a volunteer hunter education instructor for 18 years. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Lichens and bears on the Katmai Coast

by Ed Berg

There is a reason why the marine weather forecast for the Shelikof Strait is always the worst. The winds coming up the Aleutian Chain are channeled between Kodiak Island and the Katmai coast of the Alaska Peninsula. Seas of 10-20 feet are not uncommon; the State Ferry is known as the “Dramamine Express” for its passage down this wind tunnel. A persistent North Pacific low pressure center hung out for weeks during July, bringing clouds, wind and rain to the Katmai coast, frequently shutting down bear-viewing flights from the Kenai and leaving unhappy campers stranded on the beach.

I was one such stranded Katmai camper, albeit not an unhappy one, as I was kept warm and dry and well-fed for six days at the Hallo Bay Wilderness Camp, 120 air miles southwest of Homer. The camp is situated at the north end of Hallo Bay, in the heart of some of the best brown bear habitat in the world.

My task on the Katmai coast, however, was not bear viewing, but was collecting lichens growing on the trees and rocks along the coast. I was on loan for two weeks to the National Park Service from my usual post at the Kenai National Wildlife Refuge, with the assigned task of initiating a lichen survey of Katmai National Park.

Lichens are those curious little “plants” that are a mixture of both fungi and algae. The fungi provide the basic physical structure of the lichen, and the algae provide food for the fungi through photosynthesis.

Sometimes this mutualism is described as “symbiosis” because each organism (fungi and algae) provides something needed by the other, but the relationship is more like captive “farming” of the algae by the fungi. Filament-type algae for example that normally grow as long chains are occur only as single cells within a layer of the fungal body of the lichen, just like carefully planted vegetables in a garden.

The coastal scrub birch trees on the Katmai coast are heavily encrusted with leafy lichens like *Hypogymnia* and *Lobaria*, and the crowberry heath meadows are sprinkled with clumps of “reindeer moss,” which is the lichen *Cladonia*, an important winter food for caribou. I felt like a kid in a candy store as I packed my collecting bags with the great variety of lichens

growing on this lush coast.

Hallo Bay Wilderness Camp is located on the site of a long abandoned Native village of Kaguyak. Old 1950s photos show a Russian Orthodox church in a grassy meadow, whereas scrub birch and alder forest now dominate the coastal apron on which the camp is located. Like much of the west side of Cook Inlet this land was probably uplifted during the 1964 Earthquake or by post-1964 rebound. The birch and alder trees at Hallo Bay, for example, are mostly four to five inches in diameter and there are few old stumps or fallen logs on the ground, indicating a new “first time” forest. The uplift here was perhaps a few feet, and nowhere nearly as dramatic as it was in parts of Prince William Sound, such as Montague Island which went up 33 feet, according to barnacle and mussel zones stranded many feet above the highest tides.

Most people visit Hallo Bay to look at brown bears, however, and not to pick lichens and ponder tectonic upheaval. The bears here are pristine, as they have never learned about humans as a food source. The Camp operators are scrupulous about never leaving any food or smelly objects around. All garbage is flown out. Camp guests agree to not keep food in their canvas weatherport cabins, and to only leave camp with a guide. Bears occasionally pass through camp, but have never become a problem because there is nothing in camp to eat.

It was a thrill to hike with the camp guides Kevin Copley and Frank Massaro along the beach watching bears feeding in sedge meadows and looking for early salmon in the creek. In one meadow we saw two sows, each with two cubs. We stood quietly in a light rain for a half an hour watching two subadults, probably three to four year old siblings, playfully pushing each other and rolling about on the beach.

The camp guides do not carry guns or bear spray, but do carry 10-inch marine signal flares, made by Ikaros. These handheld flares produce 60 seconds of bright flames and dense white smoke, both of which are strongly repellent to bears. With these flares there is no danger of wounding the bear, or disabling oneself or others by bad shooting or pepper spray blown back into one’s face. In sixteen years of operation the

guides have only used the flares on four occasions, not in hostile encounters but to discourage over-curious subadults from approaching too closely.

After six days the cloud ceiling lifted slightly and the Park Service sent a float plane from King Salmon to bring me over to the west side of the mountains. The beach at Hallo Bay is great for wheeled landings but not so good for float landings in the surf. I was pretty wet by the time I scrambled on board the pitching 206 with my gear, but that was nothing compared to the white-knuckle flight through the cloud-filled mountains. After some moments of tense searching, the pilot found a hole in the dense clouds that led through a mountain pass to the west side where the ceiling was much higher. It would have been bad news if that hole

had closed in while we were flying through the mountains.

The operators of the Hallo Bay camp, Simyra Taback and Clint Hlebechuk, provided substantial logistical for my work and I thank them very kindly. My next article will continue my trip over to the west side of Katmai National Park.

Ed Berg has been the ecologist at the Kenai National Wildlife Refuge since 1993. Ed will be teaching his 1-credit "Geology of Kachemak Bay" course at the Soldotna and Kachemak Bay campuses of the Kenai Peninsula College, starting September 12 and 14, respectively. Registration is now open. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Youth Conservation Corps at Kenai Refuge completes another of successful summer of work

by Craig Moore



Installing boardwalk at Moose Range Meadows. USFWS

The Kenai National Wildlife Refuge's 2006 Youth Conservation Corps (YCC) was once again a blazing success story. There were five 15-18 year old girls and boys that did a mind-boggling amount of work during their eight-week program.

Most work involved helping maintaining the trails that people hike and ski on at the Refuge. They accomplished these tasks using only hand tools: loppers, hand saws, weed whips, pulaskis, rakes, shovels, and wheelbarrows.

Refuge staff evaluated proposals for YCC projects prior to the program's June 12th starting date. Where departments in the Refuge were short on manpower; the YCC crew eagerly volunteered to help get these jobs done.

One such task was helping put together the boardwalk for public fishing at Moose Range Meadows. Other projects combined the YCC's Environmental Ed-

ucation topic "Leave No Trace," rehabilitation of the Funny River Road gravel pit at mile 8, and litter patrol at the Russian River Ferry. Bags and bags of trash and fishing line were recovered from the latter two projects.

Whenever you get a chance to hike the Keen Eye Trail, Centennial Trail, Hidden Creek Trail, you will see evidence of the YCC's labors to improve the trail system. You will also encounter the YCC's handiwork if you cross-country ski the Cheechako Loop, Howling Hill Loop, or Nordic View Loop near the Kenai National Wildlife Refuge Headquarters, or ride your horse on the Hansen Horse Trail.

YCC workers also learned how to mix cement while setting a new fire ring at the Outdoor Education Center; they also replaced the old rock retaining walls with new timbers along the path leading to the fire ring.

If you go camping at Dolly Varden or Hidden Lake Campgrounds, you will see where the YCC crew removed brush along the roads and around the campsites. Perhaps the most obvious accomplishment was at the Moose Range Meadows parking areas, where the crew converted the landscape islands in the parking lots from weed beds to something more eye-appealing.

YCC performed many essential tasks in 2006; hopefully there will be funding available in 2007 to perform many more.

As leader of the YCC program, Craig Moore brings experiences in teaching science, photography, maintenance work for the National Park Service, and rock/adobe building. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

From the Land of Nessie, The Scots invade, hard-working Scots

by Dave Kenagy

Every year, for the last dozen years, we've had a Student Conservation Association trail crew to work on Refuge trails for a month or two during the summer. These crews consist of two supervisors and eight high school students from around the country. They have always done excellent trail work, rehabilitating existing trails and building new ones. This year, due to a smaller Refuge budget, they were cut.

Our seasonal backcountry trail crew is also smaller than last year, but we feel fortunate to have a very capable small crew, with Jason Young, Tim Kirby, and Josh Plate doing the work. Early in the summer backcountry ranger, Scott Slavik, and crew-leader Young planned and completed a number of excellent trail projects. However, there are always projects that are more easily completed with more hands. That's where the SCA trail crews normally fit in.

Gary Titus, our Refuge cabin manager also had a small seasonal crew, with Iven Sjodin and Bryan Taylor handling maintenance of all Refuge public use and historic cabins. Gary, like Scott, always has a few cabin maintenance projects that are best accomplished with a larger crew.

Sometimes, when you least expect it, fortune lands right on your doorstep. It did this year. In late spring, our regional volunteer coordinator, Maeve Taylor, called me on the phone asked if we could use a volunteer crew from, of all places, Scotland.

A group of high school students, from the town of Banchory, wanted to volunteer for trail work or any other projects we might have on the Refuge. Banchory, pronounced "Bankoree," is a little more than 100 miles from Loch Ness, home of the famous Loch Ness Monster.

The students held fund-raisers during the school year to pay for a summer trip to Alaska, which was directed through "Freewill Pursuits," an organization similar to America's "Outward Bound."

I discussed the possibilities with Scott and Gary, and we came up with a few tentative projects. I called Maeve back, and the wheels were set in motion. We would have a crew of 12 students and two crew lead-

ers in mid-July.

As the summer progressed, Scott and Gary mulled-over various work projects, and finally settled on a Bear Creek Trail rehabilitation project and a Moose Creek Cabin project, both on the north shore of Tustumena Lake, in the heart of brown bear country. Half the crew would work with Gary's crew, half with Scott's crew.

When our Scottish work crew arrived, they were motored across Tustumena Lake to the worksites. Scott and Gary gave them the usual work safety and bear safety training talks, and put them to work.

Bear Creek Trail had a long boggy section that needed stabilization. The crew cleaned the trail of debris and built a multi-layered "turnpike" with logs and gravel. The work was hard, with lots of bugs, but the Scots did it all with good cheer. They also did clearing work on the Lake Emma Trail, and did a fine job there, too.

The historic Moose Creek Cabin (sauna) needed 9 logs replaced to restore it to good condition. Gary supervised raising of the structure, and the careful notching and placing of new logs. The Scottish volunteers took their work seriously, and were beaming with pride when they had completed their tasks.

Bears? Yes, they did see bears—lots of them. They saw bears on the trails, bears in the salmon streams, bears by the shoreline. But, they practiced good bear-country etiquette, and never had a single problem.

They also practiced good work habits, and never had a single injury.

Scott and Gary were very pleased with our Scottish volunteers—all were polite, hard-working, and always had smiles on their faces. The work they did was first-rate.

As always, all the workers did their work for you, the people of our great country. Because of their hard work, the Refuge is a better place to visit. Your trails are easier to hike, and your historic structures preserved. I say hats off to all who worked on these projects—for a job well-done.

Dave Kenagy is the volunteer coordinator for the

Kenai National Wildlife Refuge, who would like to note that Loch Ness (Lake Ness) and Tustumena Lake have much in common; both are 23 miles long, near the sea, and glacially-carved. So, did the Scottish lads and lassies

see the Tustumena Loch Monster? Unfortunately, no. If you have, let Dave know. He's eagerly awaiting your call. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Leaf miners—tiny sculptors in the Kenai forests

by John Lundquist

People describe the damage that insects do to their trees in many different ways—devastating, horrible, beautiful, intriguing, interesting, striking. Many of the same words can be used to describe a painting, print or a sculpture. As autumn approaches, such comments might be increasingly appropriate in the forests along Funny River Road where leaf mining insects are busy sculpting leaves.

Leaf miners are insects that live for at least part of their lives between the outer surfaces of a leaf.

The leaves that they mine show an amazing variety of patterns caused by different feeding habits of these insects. These feeding patterns tend to be distinct enough in a particular tree species or geographical area to identify the insect species involved. Some of the most striking of these patterns are evident now on aspen leaves around Soldotna. The aspen leaf miner (*Phyllocnistis populiella*) causes the winding meandering path across otherwise green healthy leaves; these patterns are called serpentine mines.

The aspen leaf blotch miner (presumably, *Phyllonorycter tremuloidiella*) causes a round to oblong blister, called a leaf blotch. These different insects are common and often found among trees growing at the same site, and, may even occur on the same leaf.

Phyllocnistis and Phyllonorycter are not the only leaf miners common to the Kenai, and aspens are not the only trees affected. The leaf mining habit can be found in some of the most evolutionarily advanced insect orders—moths and butterflies (Lepidoptera), flies (Diptera), wasps, bees and sawflies (Hymenoptera), and beetles (Coleoptera). All these insect orders are common and essential components of the diversity of our forests. Leaves of all tree species on the Kenai are mined.

The Phyllocnistis and Phyllonorycter leaf miners found on Soldotna aspens are moths in the Lepidopteran family called *Gracillariidae*. A unique feature of this family is that adults are commonly very small (usually less than ¼ inch from wing tip to wing tip). It is notable that such small members of the forest community feed on its largest members—trees. In fact, Gracillids represent the largest number of species of woody plant feeders.

Under the right conditions, leaf miner populations can build to immense numbers. When enough leaf miners are present, they can make the crown of a tree look brown or grey overall. At times, especially when other environmental conditions are stressful, an infested tree can turn brown by mid to late summer, and prematurely lose its leaves. Normally, however, infested trees do not die and probably suffer little unless affected several years in a row. Usually, there is no need to apply any kind of control. Population numbers are kept in check naturally by increasingly limited feeding space of leaves infested with multiple larvae and by natural predators, parasites, parasitoids, and pathogens.

The biology of most leaf miners in Alaska has yet to be studied in detail, and indeed much about the insects that are found on the Kenai Peninsula remains unknown. This is not surprising, since Alaska is such a vast place with so many different types of insects.

The life cycle of the aspen leaf blotch miner is probably typical of many other leaf miners. Eggs are deposited by adults soon after emerging from hibernation in early spring. Early-stage larvae drill into the leaf and feed on the inner leaf cells. Larvae are flat, legless with unique mouthparts that are specialized to feed within the confined inner-leaf space. Leaf miners first appear in May or June. Late-instar larvae change their feeding habits and eat cell tissues. Larvae pupate within infested leaves. Moths emerge in August and crawl to safe locations under bark scales of, usually, spruce trees to spend the winter.

Life between the leaf surfaces affords some significant advantages to those insects that live there. Just as leaf surfaces protect the delicate palisade and parenchyma cells that are largely responsible for photosynthesis and other vital functions of a plant, the surfaces protect delicate larval stages of insects from predators. They also moderate fluctuations in moisture and temperature, mediate against environmental conditions damaging to the larvae (including pesticides), and offer easy unlimited access to the palisade and parenchyma cells that the larvae eat.

Leaf miners occur on most trees, other woody plants, on many herbaceous plants, and even on

aquatic plants. Although both the hardwood and conifer forests here are full of many different kinds of leaf miners, most leaf miners are found in tropical areas.

The most noticeable sign of leaf miners is leaf discoloration. The rate at which discolored leaves develop determine the intensity of the infestation. Over the last couple years, summer conditions had been

relatively warm and conducive to rapid development. But this year, things have not happened so fast, and the damage caused by leaf miners has generally been less noticeable.

John Lundquist is entomologist with the US Forest Service, Forest Health Protection office in Anchorage. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Katmai National Park and Preserve: a huge wilderness with lots of bears and few human footprints

by Ed Berg

Katmai National Park and Preserve is a huge piece of wild Alaska. It has a few fly-in lodges, and a 23-mile one-lane road from Brooks Camp out to the Valley of Ten Thousand Smokes, but that's about it for human infrastructure in 3.7 million acres. There are few developed private inholdings and no native villages. The high volcanic mountains along Cook Inlet are often shrouded in clouds. The mountains open to the Bristol Bay lowlands to the west through enormous lakes such as Naknek, Becharof, and Iliamna that make the Kenai Peninsula's Tustumena and Skilak lakes look like small puddles.

In my Refuge Notebook of August 11th, I described the first leg on my recent lichen collecting trip to Katmai National Park, which began with six days at Hallo Bay Wilderness Camp on the western coast of the Shelikof Strait. My next stop was Kukaklek Lake, a large remote lake at the north end of the park, where I worked with National Park Service ecologist Amy Miller and NPS intern Tara Harrington collecting lichens in subalpine tundra.

Our campsite at Kukaklek Lake was in open tundra offset from a major brown bear "right-of-way," with bears moving generally east to west along the north shore of the lake. We set up our portable electric fence around our tents and were able to sleep at night with minimal expectations of unwanted visitations. These battery-powered portable electric fences, designed for livestock, are a major technological break-through for safer camping in bear country, if you can handle 10 pounds or so of extra weight and 10-15 minutes to string up the 2-wire fence. This fence can save your camp from being dismembered by a curious bear, as well as preventing bears from learning about people and camps as food sources.

From Kukaklek Lake we flew to Brooks Camp, a major center of "industrial" bear viewing situated on a short river flowing from Brooks Lake into Naknek Lake. The brown bears (and photographers) congregate at the river falls for intense salmon fishing. Only 40 people are allowed on the viewing platform at a time, and they are periodically rotated on and off by

park rangers. The bears deploy themselves at the falls according to social status. One huge old boar had the prime fish-grabbing spot at the top of the falls. Every few minutes, he would snag a sockeye trying to make a mid-air leap up the six foot high falls, take a bite or two and casually drop the carcass, which would then be retrieved by eager sub-adults and sows with cubs waiting downstream in the riffles below the falls.

Katmai was set up as a National Monument in 1918 to protect the volcanic features present, especially the Valley of Ten Thousand Smokes created by the 1912 eruption of Novarupta Volcano. This eruption dumped 700 feet of pyroclastic flow deposits in the valley, and dropped as much as a foot of ash on Kodiak Island, 60 miles to the east. Park naturalist Peter Hamel drove Amy and I out to the Valley of Ten Thousand Smokes, and provided an excellent narrative on the history of the Park and the geology of the 1912 eruption.

The Valley of Ten Thousand, I should say in all honesty, no longer smokes, as the ash deposits have long since cooled down. Streams have cut steep-walled channels through the sandy ash, and perpetual winds have kept much of the ash moving and prevented revegetation of most of the valley floor. I sampled the lichens and mosses recolonizing the bare ash, and found many of the same disturbed soil colonist species that I would find in a road cut on the Kenai, such as *Racomitrium*, *Polytrichum*, and *Stereocaulon*.

I also collected delicate cryptogamic soil crusts that are the first step in plant succession in arid areas. These black crusts—typically composed of algae, fungi, lichens and mosses—help stabilize wind blown soil particles, retain water, provide nitrogen (from nitrogen-fixing blue-green algae), and generally prepare a seed bed for higher plants.

The final leg of our trip took us to Naknek Lake and the town of King Salmon, west of the park. National Park Service pilot Allen Gilliland flew us to the Bay of Isles on the east end of Naknek Lake to look at stands killed by the recent spruce bark beetle outbreak. The Alaska Peninsula is pretty much the western limit of white spruce and is now the "hot spot" of beetle kill in

Alaska.

We also saw hundreds of acres of mountain alders that were severely damaged by a defoliating caterpillar, *Sunira verberata*. I was surprised to learn that this insect managed to kill or greatly weaken the alders after just two or three years of defoliation. Most trees and shrubs can withstand several years of defoliation, admittedly with reduced growth but surviving nonetheless. This insect is native, not a foreign import, but it has no previous history of breaking out on a large scale, so both the scale and the mortality of this outbreak are a puzzle. It is possible that warmer and drier summers since 2002 have promoted growth

of the insect population and perhaps drought-stressed its alder host. We have not however seen such an outbreak on the Kenai, despite similar weather conditions, so climate warming is probably only part of this story.

A map and information about Katmai National Park and Preserve can be viewed at: <http://www.katmai.national-park.com/map.htm>. A very informative article on electric bear fences for camping is at <http://www.udap.com/tomsmith.doc>.

Ed Berg has been the ecologist at the Kenai National Wildlife Refuge since 1993. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Unexpected wildlife encounters make lasting memories

by Ted Bailey



Photo of Lynx. Photo Credit Ted Bailey.

Although I have had many memorable experiences of the natural world, the ones I recall most vividly were those of unexpected—and so far pleasant—encounters with wildlife.

Hiking along an old seismic trail on the refuge years ago, I sat down on a knoll off the trail to eat lunch. As I rested in the sun I saw a lone wolf in the distance unaware I was watching it trotting toward me on a connecting trail. The wind was in my favor. I wondered what the wolf would do when it detected my scent on the main trail. But when at least one hundred feet from the main trail, the wolf suddenly stopped as if it had run into an invisible wall. Its head went up as it sniffed the air; it had apparently just detected my scent in the still distant main trail. Pausing only a few seconds the wolf did a rapid 180-degree turn and ran back along the connecting trail from whence it had just come. I'm sure the wolf never saw me partially hidden behind some small spruce trees on the knoll. I marvelled at the wolf's keen sense of smell.

One evening during moose season on the refuge I sat under a spruce tree overlooking a grassy meadow.

After about twenty minutes I detected a movement in my peripheral vision. Slowly turning I saw a curious lynx cautiously sneaking up behind me, apparently trying to determine what I was. When it crouched down and remained partially hidden behind a spruce tree about eight feet behind me, I slowly took my camera lying on the ground beside me and snapped a photo of the curious lynx. The lynx merely blinked when the flash went off so I took several more photos. After about ten minutes the lynx slowly sauntered away; its curiosity apparently satisfied.

I pleasantly recall the day that a young brown creeper landed on my chest, climbed up my brown flannel shirt, apparently decided I was a strange kind of tree and flew away to rejoin its nearby siblings and parent. Then there was the river otter swimming down the Kenai River one early fall morning years ago as I fished alone at the mouth of Soldotna Creek. Seeing me standing motionless on the bank in the early dawn light, the otter veered off course at the confluence, swam in a circle several feet in front of me while checking me out and then calmly continued on down the river.

Last winter, as my wife and I drove slowly along Skilak Lake Road on a cold afternoon, I spied a lynx nonchalantly sitting in some bushes off the road. As I backed up, the lynx slowly walked parallel to the road. After several minutes watching each other, the lynx crossed the road in front of us, merely glancing over its shoulder as it cautiously continued on its way.

This summer was not without memorable wildlife encounters. One day at the end of Skilak Overlook Trail, two robin-sized, blue-gray birds with white flash tail feathers chased insects from high perches on dead nearby spruce trees. I had never seen such birds before. Later in the summer my son saw a distinctively marked juvenile of the same species near Cooper Lake and determined that it was a Townsend's solitaire, a species neither of us had ever seen before on the Kenai Peninsula.

We subsequently saw yet another Townsend's solitaire near the end of Vista Trail, perhaps one of the same individuals we saw earlier on Skilak Overlook Trail. That same evening while driving east on Skilak

Lake Road a black bear emerged from the vegetation behind the Bear Mountain Trailhead sign ahead of us. We followed behind the bear at a comfortable-to-the-bear distance nearly a mile as it slowly sauntered down the road snacking on roadside vegetation, excreting a pile of berry-laden poop and scratching its ears with its hind foot before leisurely leaving the road.

And this past week after I recently remarked to my wife that I had not seen a northern shrike in years, we saw a large bird fly to the top of a spruce tree near our house. It was a northern shrike and was being

“mobbed” by five red-breasted nuthatches. I watched it closely with binoculars for nearly fifteen minutes, savouring the rare observation before it flew away with the excited nuthatches in swift pursuit.

Ted Bailey is a retired Kenai National Wildlife Refuge wildlife biologist who has lived on the Kenai Peninsula for 30 years. He is an adjunct instructor at the Kenai Peninsula College and maintains a keen interest in the Kenai Peninsula's wildlife and natural history. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Fall fun at Kenai National Wildlife Refuge

by Nicole Gustine



photo of a fall walk through Keen Eye Nature Trail. USFWS/Nicole Gustine.

"Is it called fall because all the leaves fall to the ground?" asked a kindergartner on a recent Refuge field trip. I told her I thought it was. That same evening at home while sipping a cup of tea, I again wondered about the origin of the word "fall." To satisfy my curiosity, I logged onto my computer to see what I could learn. I discovered that "fall" is derived from the phrase "fall of the leaf" and represents the season when the leaves fall to the ground from the tree. The other term for fall—"autumn"—is derived from the Latin word *autumnus* used to identify the season from the autumn equinox to the winter solstice.

Each fall/autumn when I walk with school groups on the Keen Eye Nature Trail, it is such a joy to see how leaves and berries change color hour by hour from morning to afternoon. In a season where students have colder hands, runnier noses and more layers of clothes, I treasure the sound of their laughter as

they experience the beauty of autumn colors and the fun of rustling through the fallen leaves on the trail.

As the Education Specialist at the Kenai National Wildlife Refuge my main goal is to satisfy the curiosity children and adults have about the natural world and to get them outside to experience it. Learning outside evokes a deeper appreciation of the nature's beauty and mystery in all of us!

In that spirit of outdoor discovery, you can join us at the Kenai National Wildlife Refuge to celebrate National Wildlife Refuge Week for our special event, Fall Fun Day. The event will be on Saturday, September 30 from 11:00 a.m. to 2:00 p.m. at the Refuge Visitor Center and Environmental Education Center on Ski Hill Road in Soldotna. Come join us for the family activities, tasty snacks, hot drinks, and door prizes. Special guided nature walks are scheduled at 11:30 a.m., 12:30 p.m., and 1:30 p.m. These delightful walks last 30 minutes and cover $\frac{1}{4}$ -mile round trip. Please call 262-7021 to pre-register for walks as space is limited.

Almost a year has past since the Kenai National Wildlife Refuge Environmental Education Center was dedicated. In that time, the center has become a wonderful addition to Refuge facilities and is used for special events, school field trips, summer Junior Explorer Programs, Hunter Safety Education courses, and as a home school Discovery Room. Our first Discovery Room, "Warming Up to winter," took place this past February. If you are a home school parent or know someone who is, mark your calendar for our "Spooky Season" Discovery Room held from October 25-27, 2006.

We look forward to you and your family joining us for autumn events including Fall Fun Day on September 30 and "Spooky Season" home school Discovery Room from October 25-27. Even if you miss these fun times, you can hike the Keen Eye Nature Trail on your own and enjoy watching those colorful leaves fall to the ground!

Nicole Gustine has worked as an Education Specialist at Kenai National Wildlife Refuge for five years developing and expanding its environmental education programs. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Mutations, disease, bugs, and chemicals can all amplify fireweed flowering

by Ed Berg

Diane Owen and her husband Charlie operate the Russian River ferry in the summer and return to their home in Mississippi in the winter. Diane loves flowers and gardening, and was curious about an unusual fireweed plant she spotted growing near the Russian River this summer. She sent pictures of the flowers, and later the dried plant, to Refuge headquarters after it had gone to seed.

The profusion of flowers and leaves strikes the eye in the photos, but when you see the plant in the flesh, you immediately notice the greatly flattened stem. The stem was round coming out of the ground, but higher up it broadens to about an inch wide and an eighth of an inch thick, like a fat ribbon.

I sent Dianne's photos and a description of the plant to Pat Holloway, who is a professor of horticulture at the University of Alaska-Fairbanks. Pat said that this kind of flattened stem growth is called "fasciation." She instructed me to do an internet Google image search on "fasciation," which immediately provided dozens of pictures of this phenomenon in plant species such as delphiniums, euphorbias, forsythia, foxgloves, lilies, and primulas. Pat has observed this flattened growth once in fireweed, and more frequently in delphiniums, lilacs, and in her son's cactus collection.

The term "fasciation" comes from the Latin word for band or bandage. In anatomy, a "fascia" is a flat, fibrous band of connective tissue that holds muscles and internal organs in place.

To see how this growth form gets started, it is important to know that plants grow upward from the tip (or apex) of the stem, unlike animals, which grow in all directions. The growing zone is called the apical meristem, and it is typically housed in a bud at the top of the stem or the end of a branch. The meristem itself is dome-shaped nub of rapidly dividing cells. The cells at the bottom of the nub soon specialize and form the various tissues of the young stem, such as xylem and phloem for conducting water and food, or fibrous tissues for support. The cells the top of the nub continue dividing, making new cells and replenishing the

unspecialized, dividing cells. Thus the stem grows upward and taller.

Occasionally, however, normal cell division in the meristem gets derailed, and several competing zones of cell division occur within the meristem, as if the plant was trying to create several stems simultaneously side-by-side. This produces a widening of the stem, since the stem is now composed of several sub-stems, each with its own would-be meristem at the top.

The apical meristem in a plant controls the number of leaves and flowers on the stem. It normally does this by releasing an anti-branching hormone which severely limits the number of lateral shoots that a stem can produce. This is why gardeners prune off the apical meristems (i.e., the tips) of shrubs when they want shrubs to produce a lot of lateral branches and have a "bushy" look. All gardeners understand this phenomenon of "apical dominance," even if they are unfamiliar with its scientific name.

When fasciation compounds a simple meristem into multiple growing centers, each center loses some of its dominance and the stem produces many more leaves and flowers than it would with a single strongly dominant apical meristem. Hence the bushy look of this Russian River fireweed.

When I first saw Dianne's fireweed photos, I immediately thought of genetic mutation. Most of our common domestic flowers are mutations from usually smaller or less showy wild flowers. For centuries gardeners and horticulturists have been propagating the mutations that they like, and in time the favored mutations appear in our nurseries and seed catalogues. Nature of course works in similar fashion, but selects only the mutants that have traits that make them more competitive in the struggle for survival.

In some cases fasciation is caused by a genetic mutation in a cell of the meristem, and this mutation may or may not be reproduced in the offspring. More commonly, however, fasciation is caused by a disease or an insect or mite that partially destroys the meristem. The bacterium *Rhodococcus fascians*, for example, causes fasciated growth in a variety of ornamental and land-

scape plants such as chrysanthemums, impatiens, and daisies, and is a commercially important plant disease. Many plant viruses also are known to cause fasciation.

Fasciation can also be caused by chemicals, such as pesticides or plant growth hormones like cytokinin, as well as by mechanical damage such frost. It can occur anywhere the plant is growing through cell division, such as in a flower head, root, or fruit, as well as a stem.

The Russian River fireweed grew from a well-developed underground stem (rhizome), so it was probably one member of a patch of genetically identical clones. The fact that only one plant showed fasciation argues somewhat against a disease explanation in this case, as bacteria or a virus would probably have infected more than one plant. If it is a mutation, the seedling offspring may or may not show the trait. If for example the mutated gene is recessive, and the plant did not self-pollinate, then the seeds would be fertil-

ized by nearby normal plants with dominant genes, and the offspring would all be normal, even though they carried the mutant recessive gene. If the plant did fertilize some of its own seeds, then some of these seeds could have two recessive genes and produce fasciated plants. If the mutation was a dominant gene, which is unlikely, then all the offspring would be fasciated.

We are going to plant some seeds, and also a piece of the rhizome, to see if we can recreate this growth form anew next spring. It is somewhat of a long shot, because most of the time fasciation is not caused by genetic mutation and it disappears after the present generation. But who knows, maybe in a few years, you will open up your seed catalogue, and here will be the Russian River Giant fireweed awaiting your green thumb!

Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

A busy construction season improves refuge facilities

by Brenda Nichol



Photo of Lower Ohmer Lake campsites. USFWS/Michelle Ostrowski

This week, as I drive up Ski Hill Road, I've been enjoying the beautiful golden offerings of fall covering the road. I am starting to think about winter and how soon the ground will be covered with that first blanket of snow. Not wanting to dwell on that rapidly approaching event, I think back to the green lushness of... the construction season!

This past summer we saw many saw many construction projects underway on the Refuge. We started excavation in May for our new connection to city water and sewer. This was not a small undertaking for buildings located at a considerable distance and up a high hill from the water and sewer lines along Funny River Road. Getting to the Refuge headquarters on Ski Hill Road is normally an effortless drive, but trying to get to the headquarters this summer was quite the chore. It almost seemed that the route to the headquarters changed on a daily basis. This week we finally got the last building connected to the plumbing. Now all that remains is paving the roads of the headquarters complex. Ski Hill Road is not being paved, however.

Although the water-and-sewer project is still impacting Refuge visitors to some extent, construction projects at several Refuge campgrounds have been completed and are already being put to good use.

At Hidden Lake Campground, toilet facilities were upgraded to concrete outhouses. Landscaping was im-

proved and new concrete walkways were poured in some areas. Campsites were upgraded with concrete picnic tables and some fire pits were replaced.

Hidden Lake wasn't the only campground on Skilak Lake Road that received attention. Lower Ohmer Lake campground underwent an extreme remodeling and was closed for during July.

If you have camped at Lower Ohmer Lake before, you might not recognize it now. The access road into the campground was improved and widened, and the entire campground has been changed. A fourth campsite was added to the left of the pit toilet; and, to its right, a handicap accessible campsite was created. All the campsites that were formerly located on the right as you drove into the campground have been relocated, making this campground into more of a walk-in tent camping area. Additional parking was added to the area on the right where the bulletin board now stands and the boat launch was upgraded.

Watson Lake Campground received much of the same treatment as Lower Ohmer. The road was widened and the campground was returned to its original size of three sites. The water pump was relocated in order to be in compliance with state regulations. The most notable change was the placement of large rocks and grass buffers to define the camping areas.

Although campground construction projects have ended, there is one project that will be continued next spring along the Russian River.

If you drove the Sterling Highway this summer and looked to see how many people were fishing in the Russian River Ferry area, you probably noticed the bright orange fencing. This very popular salmon fishing area has received a lot of use, and the riverbank has eroded and lost most of its vegetation. This year the south bank of the river, upstream from the ferry, was closed to foot traffic. A wooden fence was built at the top of the bank to direct anglers to the stairways which were added to provide continued access to the river's salmon runs. This 650-foot section of riverbank was planted with alder and willow. Next year, the remaining 700 feet of riverbank will be re-vegetated and another temporary closure will be instituted to protect the newly planted vegetation. Although the

re-vegetation project may be an inconvenience again next year because of the temporary closure, the benefits to the Russian River fishery will be seen for years to come.

I know that this year's construction activities around the Refuge caused many visitors and employees to be inconvenienced. Hopefully the future benefits from all the construction projects will far outweigh the present inconvenience. Now when I drive down

Ski Hill Road, besides dreading the oncoming winter, I can look forward to reaping the rewards of one summer's construction.

Brenda Nichol lives in Soldotna with her son Bryan Wise. She has been working at the Kenai National Wildlife Refuge since 1989. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Variety is the spice of life

by John Morton

George Shiras III, a famous nature photographer for the National Geographic Society, once wrote that “were all of Alaska erased from the map except the Kenai Peninsula and its immediately adjacent waters, there would yet remain in duplicate that which constitutes the more unique and that which typifies the whole of this wonderful country.”

Shiras was simply acknowledging something that most of us already know—the Kenai is a wildly diverse landscape. It ranges in elevation from the salt marshes of the Chickaloon Flats to remote nunataks in the Kenai Mountains. It includes vast expanses of spruce and hardwood forest, and wild rivers that originate from the Harding Icefield, the largest glacier wholly within the U.S.

And there’s more than moose that live here. Snow buntings peck at ice worms which, in turn, feed on algae growing among ice crystals on Exit Glacier. Bristletails chew on lichen-encrusted rocks along Skyline Trail. Dwarf forms of longnose suckers spawn in the Finger Lakes. Merlins nest in witchbrooms that sprout from white spruce because of a fungal parasite.

Wildlife and plants on the Kenai are indeed very diverse. The Kenai Refuge has 200 vertebrate species and almost 500 vascular plant species. This diversity results in part from the peculiar geography of the peninsula. The Kenai Mountains ensure that the eastern side is much wetter than the western side of the peninsula. The Sitka spruce forests on the Seward side and in Turnagain Arm are the northern-most extremes of the coastal rainforest that extends all the way to Oregon. The white and black spruce forests on the Soldotna side are near westernmost extreme of the boreal forest that extends across Canada.

In 2004, we launched our Long Term Ecological Monitoring Program or LTEMP, an ambitious effort to expand our knowledge of biological diversity on the Refuge. Working cooperatively with the U.S. Forest Service’s Forest Inventory and Analysis program, we sample breeding landbirds, vascular and nonvascular plants, and arthropods on 350 plots at five km intervals across 2 million acres.

Data from LTEMP sites have expanded our species inventory to over 1000 species including 168 arthropod

taxa (16 orders) and 205 bryophyte and lichen species. We’ve identified almost 100 species within an 18 foot radius of one of our LTEMP plots in a 40-year old black spruce wetland in the Kenai Lowlands!

Most recently, we’ve identified a plant hopper (in the family Achilidae) that’s new to science! And this is the second insect species new to science that has recently been found on the Refuge. All of this simply underscores how little most of us, even professional biologists, know about the world immediately around us.

Exactly what is biological diversity or “biodiversity,” for short? Biodiversity is more than a simple list of species. Definitions often include some reference to the relative abundance and spatial distribution of species. Biodiversity can include how populations vary over time, as well as through space. So, for example, it’s not enough to know that we have moose on the Kenai. It’s as important to know that moose populations vary with the availability of hardwood browse which, in turn, varies with the frequency of wildfire. Our discussions of biodiversity at the Refuge include these natural processes that create and sustain our diverse landscape.

What might surprise some Kenai old-timers is that moose, although an important critter, is not the primary focus of the Refuge. The Alaska National Interest Lands Conservation Act (ANILCA) of 1980 mandated that the Refuge’s primary purpose is to conserve fish and wildlife populations and habitats in their natural diversity. This piece of legislation even went so far as to define “fish and wildlife” as any member of the animal kingdom including, without limitation, any mammal, fish, bird, amphibian, reptile, mollusk, crustacean, arthropod or other invertebrate. ANILCA greatly broadened the refuge’s primary purpose beyond that of the old Kenai National Moose Range, which was established in 1941 to protect the then-described “giant Kenai moose” and its habitat.

Why care about biodiversity? We all have a tendency to focus on the life forms with which we interact the most. For some of us, that may be the four-legged animals that we hunt and eat. For others, it might be the salmon or shellfish that we fish for recreationally

or commercially. And for some, it might be the chickadees and nuthatches that visit our feeders in winter or the spruce bark beetles that kill the trees in our backyards.

But biodiversity includes much more than our limited knowledge of the species that overtly affect us. Biodiversity is quite literally the foundation upon which natural systems function. The fact that we know so little about what inhabits the Kenai is somewhat daunting and certainly a little alarming to a professional biologist. Aldo Leopold, the author of the

book *A Sand County Almanac* and the father of modern wildlife management, said that “the key to intelligent tinkering is to keep all the parts.” This statement sums up both the legal and philosophical basis for management and science on the Kenai National Wildlife Refuge.

John Morton is the Supervisory Fish & Wildlife Biologist at the Kenai National Wildlife Refuge. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Another day, another hat

by Scott Slavik

There is perhaps no other job that embodies the label of “jack of all trades” more than a being a Ranger at the Kenai National Wildlife Refuge. On a daily basis my colleagues and I confront a variety of situations which require us to “wear many different hats.” Having recently returned from a major wildland fire incident in eastern Oregon, the newest “hat” in my repertoire is a fire helmet, affectionately known as a “bucket.”

With our cool wet summer, wildfire hasn’t really been on our minds like it was last season when the Fox Creek Fire and King Country Creek Fire burned 36,000 acres of the Kenai Peninsula. However, it’s been a very different story in the Lower-48. With almost 9 million acres burned to date, this year has been the worst fire season on record.

When full-time fire fighting resources become stretched too thin to adequately protect life and property, “collateral-duty” fire fighters are made available to assist national firefighting efforts. Twenty-person inter-agency fire crews are formed by combining forces with personnel from other state and federal resource agencies who also maintain a cadre of qualified part-time fire fighters. The summer of 2006 saw a record number of inter-agency crews sent from Alaska to assist national firefighting efforts.

Alaska Interagency Crew #5, as we were called, was comprised of park rangers, wildlife biologists, forest technicians and trail crew workers from the Chugach and Tongass National Forests, Denali National Park and the Kenai National Wildlife Refuge. We were a mix of highly skilled full-time fire suppression professionals and “newbies” who were on their first fire assignment. Our crew was assigned to the “Shake Table Complex Fire” on the Malheur National Forest in Blue Mountains of eastern Oregon. During our two week assignment, the fire increased in size to 15,000 acres before we were able to fully establish a line around its perimeter. I guess it’s only fair to mention that we were assisted by an additional 1,300 other fire fighters and support personnel.

The tools and tactics used to suppress the fire ranged from primitive and traditional to sophisticated and advanced. At times, digging line with Pulaskis and

shovels felt futile, but using heavy equipment in such steep and inaccessible terrain wasn’t an option. Drawing water from portable tanks using pumps and hoses seemed archaic, but was vital to cool “hot spots” and extinguish root systems burning deep underground. Our work on the ground wouldn’t have been possible without the assistance of air support. A fleet of Black Hawk Helicopters performing “bucket drops” and C-47 Air Tankers dumping retardant kept the fire from jumping our newly constructed line. Technological advancements allowed cutting edge computer “modeling” programs to predict the speed, direction and intensity of the fire based on the availability and types of fuels, topography and weather.

Our temporary home situated in a large inhospitable field of sage brush and thistle was transformed into a functioning village almost overnight. Hundreds of personal tents grouped together by crews began to resemble mini-neighborhoods. One cluster of tents seemed to be arranged in neat rows appearing almost affluent while another jumbled cluster looked as if it must surely house the “riff-raff” of our little community. Alaska Crew #5 claimed some prime real estate near a portable hot water hand washing station and outhouses (but not too close). Location, location, location!

A caterer capable of cranking out nearly 3,000 hot meals a day from the back of a converted horse trailer became our restaurant. Hot showers were available from retrofitted semi-tractor trailers and a cozy little yurt offered laundry service. What looked like a travel trailer was our hospital with a friendly staff and a cure for just about any ailment. Sometime between when I went to sleep on Saturday night and the next morning, a tent was erected for Sunday worship. With all of our basic needs being provided for, the place strangely started to feel “homey.” Although, after working 14-16 hour shifts everyday there was very little time to enjoy our community’s assets.

Just like “real” neighborhoods, suppressing a large wildfire requires a dynamic group of people with a broad range of skills and abilities to be functional and productive. The impromptu community that is formed around large fires, although temporary, has lasting

benefits. Knowledge is shared, experience is gained, new skills are learned and friendships are formed.

The fire season in the Pacific Northwest has finally started to slow down and I'm sure the sage and thistles are flourishing where our tent city used to be. I've put away my fire helmet for the year and await my next

adventure and the opportunity to try on another "hat."

Scott Slavik is a Backcountry Ranger and part-time Wildland Fire Fighter on the Kenai National Wildlife Refuge. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Refuge education specialist migrates North

by Claire Caldes

The Kenai National Wildlife Refuge staff says good-bye to one of its own next week. Nicole Gustine, better known to some of you by her maiden name of Johnson, is moving to Fairbanks to continue her work with the U.S. Fish and Wildlife Service and to be with her new husband, Dave Gustine.

Nicole started working at the Kenai Refuge in June 2001 as a full-time Environmental Education Specialist. Upon starting her job, Nicole was immediately swept up in the summer season rush, when the staff size triples and the workload is very fast-paced and non-stop until mid-September. It wasn't until seasonal employees began to drift off for winter destinations, that some permanent employees realized that Nicole was a new addition to the staff and not one of the seasonal employees. We now know and appreciate what a wonderful addition to the staff she has been!

Environmental Education is a Congressional mandate for the Kenai National Wildlife Refuge, and Nicole and her staff have worked hard to implement this special directive. Nicole has spent the last five years developing and presenting environmental education programs to local public and home school students of all ages. Through her dedicated efforts, school groups have received high quality environmental education programs on a wide variety of topics.

Each year approximately 3,000 students from south-central Alaska participate in educational programs at the Refuge. Participants range from kindergarten classes exploring animal senses to fourth, fifth, and sixth graders experiencing snowshoeing for the first time as a low-impact form of winter recreation. School groups, scout groups, youth groups, teacher and youth workshops are some of the more frequent groups attending environmental education trips lead by Nicole and crew.

Most of the programs take place at our new Environmental Education Center and on the Keen-Eye Trail located at our headquarters site here in Soldotna. Several programs are also taught in the field utilizing the Refuge's unique facilities such as our Outdoor Education Center located on Swan Lake Road, at campgrounds near Skilak, Hidden, and Kelly Lakes, and on our vast network of trails. The Environmental Educa-

tion team has developed nine curricula aligned with Kenai Peninsula Borough School District standards. All of these programs are designed to increase the participants' awareness and understanding of wildlife and the natural world. They also present ways in which individuals can reduce their impacts on the environment.

Nicole also coordinates the Refuge recycling program for our office and shop waste products. She set up collection areas in all the main facilities at our headquarters site where recyclable items are collected and separated. Everything from newspapers and aluminium cans to used batteries, scrap metal, and used oil are recycled. About once a month, she transports these items to the recycling center at the Borough landfill. In 2005, she received a National Fish and Wildlife Service Environmental Leadership Award for her efforts in recycling and reaching out to Refuge staff and the public alike in fostering better environmental stewardship. Only three such Environmental Leadership Awards were given nationally that year.

When the Arctic Winter Games came to the Kenai Peninsula in 2006, the snowshoe event was held at our headquarters site, and athletes used Refuge ski trails for their races. Nicole again stepped up to the plate and volunteered to be the chairperson for this event. She spent numerous hours in planning meetings, scheduling and coordinating volunteers, supervising the events, and dealing with coaches. There were some challenging and stressful moments for her during that weeklong event, but she came through with flying colors and lots of good memories of a lifetime experience. Nicole was also chosen to perform in both the opening and closing ceremonies of the Arctic Winter Games with other specially selected dancers. She loves to dance and is a student and part-time instructor at Encore Dance Academy in Kenai.

It has been a great experience working with Nicole and to have witnessed some of her interactions with school groups and adults. She strives to educate and promote environmental conservation in all aspects of her life. She has exposed numerous children and adults to the wonders of the natural world and hopefully opened their eyes to a new world that they will

learn to respect and protect. The Kenai Refuge staff will miss her, but she will do magnificent things wherever she goes. Good-bye and good-luck to a friend and colleague as she begins the next adventure in her life.

Claire Caldes is a Refuge Operations Specialist and

the Oil & Gas Liaison for the Kenai National Wildlife Refuge. She has been working with the U.S. Fish & Wildlife Service for 28 years, 7 of those years on Alaska Refuges. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Miximalist versus minimalist technologies for bear safety, Part 1

by Ed Berg



Ed Berg demonstrates a hand-held marine flare, which can be used as a bear deterrent. USFWS/Jane Tollefsrud.

Bear protection is a universal interest among outdoor Alaskans. Outside of our various protective shells, we are intruders on bear turf and bears can have a proprietary objection to our presence.

Like many Alaskans I have gone the full route in bear protection—aerial flares, .44 magnum pistol, 12-gauge shotgun, pepper spray and most recently hand-held marine flares. To date, noise making and vigorous hand-waving have been my best deterrents.

Every spring at the Kenai National Wildlife Refuge we run new field employees through a two day bear safety training program, including a day at the rifle range shooting at stationary and moving targets with slug-loaded 12-gauge shotguns. For many of our younger seasonal workers this is the first time in their life that they have ever handled a gun. Our field crews all have at least one person carrying a shotgun, who has qualified as a shooter by hitting a moving bear target in the kill zone two out of three shots. Permanent employees must re-qualify every spring at the range with the moving bear target. We also encourage everyone to carry pepper spray and noisemakers.

To date we have been lucky; our field crews have never had to spray a bear or shoot in self-defense, probably because we typically make a lot of noise in the field and generally work in groups. We like to remind ourselves of the statistic that there has never

been a serious bear attack on four or more people, at least when they are grouped together.

Like many safety issues, the real issue with bears is what you yourself can deliver when push comes to shove. Can you effectively deploy a shotgun, pistol or pepper spray? Will you have the presence of mind to not run, or to curl up in a ball and let a brown bear take a bite out of you? We do our drills—both physical and mental—and hope that the reflexes will be there when we need them.

There seem to be two schools of thought about bear protection: maximalist and minimalist. The maximalist approach basically uses firearms, which have a comforting appeal to the experienced user, myself included, and should theoretically stand up well in liability court cases. The well-armed traveler who is “loaded for bear” can however have a boundless sense of self-confidence that statistics suggest is vastly over-inflated.

The minimalist approach—in the extreme—uses only careful awareness of one’s surroundings and makes plenty of noise. For whatever reasons, most of us probably use this approach on informal outings, jogging, and walking the dog. The long history of bear-mauled unarmed joggers on the Kenai suggests that this is not an adequate approach.

The next step up uses non-lethal tools like pepper spray, flare guns, and hand-held flares. When I say “non-lethal,” I mean non-lethal to both bears and to fellow human beings, including the user.

A recent study of 258 bear-human incidents in Alaska involving firearms found that firearms were effective in only 68% of the cases, i.e., the failure rate was 32%. Conversely, pepper spray was effective in 94% of 75 incidents in Alaska where pepper spray was deployed. This study by Tom Smith, formerly of the USGS in Anchorage and now at Brigham Young University in Utah, and his colleagues is currently under review, with anticipated publication in 2007.

In spite of its impressive statistics, pepper spray has its detractors. Clint Hlebechuk and Simyra Taback operate the Hallo Bay Wilderness camp, where

tourists arrive daily for world-class brown bear viewing along the Katmai coast. Clint and Simyra are outspoken critics of pepper spray and don't allow clients to bring pepper spray to camp. They and their guides carry Ikaros-brand hand-held flares and no firearms. Ikaros marine flares weigh only eight ounces, are 10-inches long, and are activated instantly by pulling a string. They can be fired bare-handed and burn for 60 seconds with an extremely intense red light and abundant smoke. These are not aerial flares, and do not shoot out any kind of fireball into the air or at the bear. Nor are they fusees, such as are used for highway safety warnings, that are activated by scratching on a striker surface. The flares are made by the Swedish company Hansson Pyrotech and cost about \$18 at Eagle Enterprises in Homer and Anchorage. (A Google internet search on "Ikaros flares" leads to a color video on these flares.)

These flares appear to be well-suited for the careful, non-confrontational kind of bear viewing done at places like Hallo Bay and McNeill River. The bears in

these places are not tame but they are more or less acclimated to the presence of human beings. Flares have been used on four occasions in 16 years at Hallo Bay to discourage overly inquisitive sub-adults from approaching too closely. How well they would work with a surprised bear, say a mother with cubs, has not been tested at Hallo Bay. Pepper spray, however, has a proven track record in hostile close encounters, and has been 94% effective, according to Tom Smith's data.

Next week, I'll explore the pros and cons of these technologies in more detail. I have no "one size fits all" solution to recommend for all cases. Bears vary in their personalities, and bear encounters vary in the degree of closeness and surprise. I, for one, haven't given up my 12-gauge, but I am including more non-lethal alternatives in my arsenal of possibilities.

Ed Berg has been the ecologist at the Kenai National Wildlife Refuge since 1993. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Miximalist versus minimalist technologies for bear safety, Part 2

by Ed Berg

Last week I introduced readers of this column to some of the pros and cons of firearms, pepper spray and Ikaros hand-held marine flares for bear protection. The hand-held flares, to recall, are a 10-inch flare that is activated by pulling a string; the flare burns with an extremely intense red flame for 60 seconds. Pepper spray comes in an aerosol canister with a trigger and a safety clip that must be removed prior to firing.

Pepper spray has been widely marketed over the last several decades and has a proven track record when properly deployed. In forthcoming publication Tom Smith and colleagues analyze 76 incidents of pepper spray use in Alaska in the period 1985-2005, for both brown and black bears. In close-range encounters they found that pepper spray stopped whatever behavior brown bears were displaying in 96% of the cases; the figure was 89% for black bears. Curious brown bears were dissuaded 100% of the time, and curious black bears 83%. These figures make a compelling case for pepper spray. As noted last week, firearms were successful in only 68% of cases examined (175 of 258 incidents).

Hand-held flares are a much newer product, and are not specifically designed for bear deterrence. The Ikaros-brand flares, recommended by Clint Hlebechuk and Simyra Taback of the Hallo Bay Wilderness bear viewing camp, are basically waterproof marine signal flares for lifevests and boat emergency kits. The flares are less bulky than pepper spray and can be carried in a deep pocket. They can also be used for signaling or starting fires in survival situations.

Starting fires, I should say, is indeed one definite drawback of flares; in tinder dry forest it would be quite possible to start a serious fire, if one dropped the burning flare on the ground. The flare can be held bare-handed for its entire 60-second duration of burning, but it could be dropped in a moment of confusion.

Pepper spray also has certain limitations. Small aircraft pilots often don't want pepper spray inside the cabin, because the pilot could be incapacitated if the canister leaked. Float-plane operators however can safely stow pepper spray in the float compartments.

According to Clint Hlebechuk, hand-held flares are becoming increasingly popular with wheeled-plane bush pilots who land on beaches, sandbars or tundra, because most wheeled planes don't have external storage compartments that are effectively sealed off from the cabin. Neither pepper spray nor flares can be taken on most commercial flights without special shipping as hazardous materials.

It also appears that bears are attracted to the oil-based propellant used in pepper spray. People who have sprayed pepper spray around their camp in hopes of repelling bears have been dismayed to find bears gleefully rolling around in the sprayed vegetation, after the active ingredient (capsicum, a red pepper derivative) had evaporated. Tom Smith wrote a cautionary article about this in the *Wildlife Society Bulletin*, 1998, 26:92-94.

Pepper spray canisters do not have a pressure gauge like a fire extinguisher, so they need to be weighed if there is any doubt about them being fully loaded. Tom Smith recommends disposing of canisters that are less than two-thirds of full weight. A single brief pull of the trigger (outside!) will test the pressure.

In Tom Smith's view the best bear protection has both a long-range and short-range defense. For long-range defense Tom favors a flare pistol that fires a screamer projectile 50 feet or more, making noise and emitting lots of sparks and sound. These are available from Northern Security in Anchorage or Margo Supplies in Alberta. In the short-range department Tom strongly favors bear spray, saying, "I can see the utility of hand-held flares but other, better in my opinion, options exist so why bother?"

Regardless of one's choice of technology, there are strong conservation reasons for using non-lethal deterrents for bears. As the human population of Alaska increases, more and more heavily armed sportsmen venture into the outdoors, i.e., into bear habitat, especially along salmon streams. On the Kenai we typically have a dozen or more so-called "defense of life or property" (DLP's) killings of brown bears every year, which

often triggers cancellation of the fall brown bear hunt. Many of these DLP's could probably be avoided if people were equipped with suitable non-lethal deterrents. According to Tom Smith's data, human beings are much more successful in protecting themselves with non-lethal pepper spray than with firearms, and certainly the bears survive much better with non-lethal deterrents.

In conclusion, I would again encourage readers to

explore some of the technologies discussed in these articles, and perhaps utilize several different options according to the demands of the situation. There is more than one way to skin a cat, and the same can be said for bear trouble.

Ed Berg has been the ecologist at the Kenai National Wildlife Refuge since 1993. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Kenai Refuge's 65th Birthday—and my brother's

by Bill Kent

This December will mark the 65th anniversary of President Franklin Roosevelt's executive order which created the Kenai National Moose Range. I personally find this easy to remember because my brother was born on the same day the order took effect. I try not to dwell on the fact that my brother will be that old—because I am acutely aware of my own pre-1950 birthdate. Kenai Refuge and my brother share a few characteristics other than a birthdate; bear with me a little and I'll try to explain my reasoning.

Kenai Refuge's heart is its' wildlife habitat, which gets distressed and "clogged" when the vegetation grows without some "renewal" periodically by wild-fires. Even though he ran marathons over the years, my brother's own heart was in the same condition a few years ago, and he suffered a heart attack. He got an ambulance ride to an Atlanta hospital and eventually underwent a multiple bypass operation. One could reason that his operation allowed his heart to function more normally, just as a wildfire allows natural processes to renew themselves and generate new vegetation to better provide for wildlife.

After his heart bypass, my brother's doctor discovered one of his carotid arteries was blocked; he describes the succeeding procedure as getting his neck "roto-rootered"... lovely. I can associate that with the periodic floods which sweep down the Kenai River and other rivers on the peninsula every few years. While the "procedure" is not a thing of beauty, the cleansing effect certainly provides new routes for the life blood of the Refuge and Peninsula to flow more freely.

My brother is a semi-retired Methodist pastor; "semi" because after he officially retired the church's conference asked him if he would be willing to return

and be a "supply pastor" at a rural church in north Georgia. I am constantly amazed at his ability to find the best in human beings, and help them find their own paths to some kind of spirituality that suits the particular individual. Although Kenai refuge is not "retired", I think it does have the ability to help every person who uses its' lands and waters to find spirituality in a manner that suits them.

For some of you, that means fishing the lakes and rivers, for others it means a family camping outing at one of the Refuge campgrounds. Some may find that hunting or trapping on the Refuge provides the best avenue for experiencing a spiritual episode while alone out in the forest and fields. Others find it experience hiking trails or canoeing through the wilderness.

Where am I going with all this talk of renewal, cleansing, and spirituality? Only that while understanding that Kenai Refuge is many things to many people, its' two million acres allows each of those individuals or user groups the space and means to reach a place and time that provides an ability to connect with some type of spiritual experience. Your experience will probably not be the same as mine, or your neighbor's. The connection, like my brother and this Refuge, is that if we allow ourselves, each of us can find cleansing, renewing, and maybe even a spiritual effect while we make use of this present given to us by President Roosevelt 65 years ago.

Bill Kent is the Supervisory Park Ranger at the Kenai National Wildlife Refuge who has lived on the Kenai Peninsula for over 15 years. He and his family live in Sterling. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Giving thanks for the 2006 National Fire Management Workshop

by Doug Newbould

Last week I was privileged to attend and participate in the 2006 National Fire Management Workshop at the National Conservation Training Center in Shepherdstown, West Virginia. This U.S. Fish & Wildlife Service event brought together national and regional office fire management staff, fire management officers, prescribed fire specialists, wildland-urban interface coordinators and fire planners from every region of the United States. We were joined by the Regional Refuge Chiefs and the Refuge System Division Chiefs, who along with Refuge Managers are those most responsible for the management of the National Wildlife Refuge System.

I felt a very real sense of honor and pride in spending a week with more than 250 of my brother and sister—wildland firefighters and our leaders, many of whom are unsung American heroes. The workshop theme was “Leadership, Vision and Skills for the Future” and our guiding vision was “We commit to safety and invest in current and future leaders to provide the excellence in Fire Management needed to help fulfill the mission and promise of the National Wildlife Refuge System.”

This was only the second time in our history that FWS fire managers have gathered in one place. The first was in March 1999, when less than 100 gathered in Nevada. Much has changed in the fire management world in the last seven and a half years. In response to global climate change, hazardous accumulations of forest fuels and an ever-increasing wildland-urban interface across the country, wildfire seasons are lasting

longer and burning more structures and acres, and extreme fire seasons are occurring more frequently.

Since 1999, the National Fire Plan (2001), the President’s Healthy Forest Initiative and the 10-Year Comprehensive Strategy and Implementation Plan were developed to guide all public land management agencies in addressing these wildfire and fuels management issues. In the face of these and other changes, a national meeting of some of the best wildland fire management minds in the country—was the right thing to do.

Throughout the week we discussed the strategic issues we all face as fire managers, learned about some of the new technologies and tools we can use, developed a list of fire management priorities and looked at how to become a highly reliable organization. And several times during the week we paid tribute to the 22 wildland firefighters who have perished in the line of duty in 2006.

I saw many old friends for the first time in years and met many new ones as well. I was humbled by the stories of sacrifice and success shared by my peers, and I am thankful and proud to be their brother. And if by chance you meet one of these unsung heroes one day, please remember to thank them for their service to you and the nation.

Doug Newbould has lived and worked on the Kenai Peninsula since 1991, and involved in Refuge fire management since 1997. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Global warming will bring more forest fires all over the Earth

by Ed Berg

Poet Robert Frost observed that, "Some say the world will end in fire, some say in ice..." Last month I attended the 3rd International Fire Ecology and Management Congress in San Diego where opinions were definitely of the fire persuasion. Ice didn't stand a chance.

Ruben Grijalva, chief fire marshal of California, described how the fire season in California now begins in January and runs into December because the formerly cool winters have grown so much warmer. Arson has gotten worse, for sure, but warmer winters provide drier fuels for the arsonists.

Fire researcher Mike Flannigan of the Canadian Forest Service, described the increasing frequency of big fire years in the northern boreal forests. In northern forests most acreage is burned episodically in really large fires, which occur in years with hot summers, such as 2004 and 2005 in the Yukon and Alaska. In the last several decades hot summers and big fire years have become more frequent throughout Canada, Alaska, and Siberia.

Warm summers have also increased spruce bark beetle outbreaks, as we well know from the warm 1990s on the Kenai. The net affect of more fire and more bug kill is that since the early 1990s the Canadian boreal forest is no longer a carbon "sink," or storehouse, but is now a carbon source, i.e., the forest is now losing carbon dioxide to the atmosphere. This creates a nasty positive feedback loop, because adding more CO₂ to the atmosphere makes the atmosphere warmer, which causes more fire and bug kill, which makes the forest give up more CO₂, which makes the atmosphere still warmer, and so on. Such a positive feedback loop doesn't necessarily mean that the world will end in fire, but it could mean that the world will run out of forests.

One of the liveliest speakers was Professor Richard Alley from Penn State University. Alley is a leading researcher of the 110,000 year-by-year climate history recorded in ice cores taken from the Greenland icecap. In these cores Alley found evidence of more than a dozen rapid climate change events, where the climate

changed by as much as 10°F in less than a decade. The last such event was 8200 years ago. These rapid warmings occurred when the northerly flow of the Atlantic Gulfstream was disrupted, and heat accumulated in the southern latitudes. These stoppages of the ocean heat conveyor belt warmed the southern latitudes but froze out Europe. (The conveyor belt stops when too much fresh water is dumped in the cold North Atlantic and the very salty Gulfstream water cannot sink and flow back south along the ocean floor.) Recent studies have found the North Atlantic freshening with meltwater from the Greenland icecap, so the possibility of such a disruption is not simply an academic theory.

Scripps oceanographer Tim Barnett described the increasing acidity of the oceans as seawater absorbs more CO₂. The oceans are the Earth's largest CO₂ reservoir, holding 50 times more CO₂ than the atmosphere and 20 times more than the terrestrial biosphere. Acidic seawater is starting to dissolve coral reefs, shellfish, and plankton with calcareous shells. Barnett showed photos of single-cell plankton whose shells were heavily etched and thinned by acidic marine waters. Some of these plankton take up CO₂ for photosynthesis and are important parts of the ocean food chain; their loss will likely reduce marine fish populations.

Several speakers expressed concern that the widely publicized global climate change models do not account for the kind of rapid temperature changes that Richard Alley observed in the Greenland cores. These models for example forecast a gradual 4-5°F rise for south-central Alaska in the next 100 years, but they have no mechanism for predicting the kind of rapid changes brought on by a disruption of the Gulfstream, releases of large amounts of methane from melting permafrost, or breaking off a large chunk of the Antarctic iceshelf. The models are thus conservative, and climate warming could be much more sudden and severe than predicted.

I'll admit that I was surprised to see the interest in climate change dominating this international conference, which mostly drew attendees from the Lower-48,

and southern countries like Mexico, Brazil, Australia and South Africa. Climate change effects are well-known to most Alaskans, but among the researchers and managers of fire south of Alaska climate warming appears to be a tangible and recognized fact of life, if one can judge by this conference.

There were more than 625 talks and posters at this conference, organized into ten simultaneous tracks. Most of the talks were much more specific and local than the global talks described above. I gave two talks—one summarizing our many years of fire history studies on the Kenai Refuge, and the other on landscape drying, spruce bark beetles and fire regimes on the Kenai. I have short summaries of these talks which

I can send interested readers by e-mail or post upon request (edward_berg@fws.gov, 260-2812).

The general theme coming through these talks was that we will see a lot more fire on the landscape in coming decades, all over the planet. Global warming has many costs, and wildfire won't be one of the cheaper ones.

Ed Berg has been the ecologist at the Kenai National Wildlife Refuge since 1993. Ed will teach his one-credit course on Global Climate Change at the Kenai Peninsula College in Soldotna and Homer, beginning Feb 27 and Mar 1, respectively. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

DIVERSITÉ

by Matt Bowser

I recently returned from the 2006 meeting of the Entomological Society of Canada in Montreal, Quebec, where this year's theme was *diversité* (diversity). Many interesting talks and posters were presented about insects and spiders of northern North America, ranging from genetics of butterflies in British Columbia to behavior of small-headed flies in Washington and biocontrol of the amber-marked leaf miners on birch trees in Alaska. The six or eight-legged subjects of these studies were often the same species we have here, reflecting the similarity between our forest and alpine tundra on the Kenai to the vast boreal forest and tundra of the rest of northern North America.

There were numerous talks related to the diversity theme, such as spider communities along the Dempster Highway in the Yukon Territory, diversity of flies in wetlands of various sizes in Quebec, and studies on the ground beetle assemblages of northern prairie range lands. I traveled to the meeting to present on our efforts to inventory, model, and monitor terrestrial insects and spiders on the Kenai National Wildlife Refuge.

As with all Alaska refuges, the Kenai NWR was specifically mandated by Congress in the Alaska National Interest Lands Conservation Act of 1980 (ANILCA), "to conserve fish and wildlife populations in their natural diversity," where fish and wildlife is defined as, "any member of the animal kingdom including without limitation any mammal, fish, bird, amphibian, reptile, mollusk, crustacean, arthropod, or other invertebrate." We knew little, though, about the most diverse and one of the most ecologically important groups of animals on the Kenai; we did not have a good idea of what kinds of insects we had here, much less where they occurred or how abundant they were.

In order to address our conservation mandate, we designed a Long Term Ecological Monitoring Program (LTEMP) to efficiently sample many kinds of animals and plants on a grid of 300 points distributed over the entire two million acre refuge. We sampled this grid in 2004 and 2006 using fast, "swat team"-like methods to quickly inventory plants, birds, and insects at each point, usually with helicopter support.

As I attended various presentations on arthropod diversity and spoke with other researchers, it became apparent that our approach to inventorying the insect and spider fauna of the refuge is unique. Most comparable projects focus on relatively small groups of species in either a small area or a few locations. What sets our work apart from most other efforts is that we have sampled many kinds of plants and animals, and we have done so over a vast area of two million acres.

This enables us to make generalizations that apply to the entire Kenai National Wildlife Refuge. For example, we found that both the abundance of insects and the number of different kinds of insects (diversity) were highest in the lowland areas of the refuge and lowest in the mountains. We can learn about the distribution and abundance of insect species, assess the preferred habitat of each species and produce distribution maps of each species.

Since we sampled repeatedly, we can show differences between years. For example, we found that mosquitoes were not deterred by the rainy June of 2006 (an average 19 mosquitoes per sample) compared to the dry June of 2004 (12 per sample). Bumblebees, which use the sun to navigate, were infrequent in our 2004 samples, but were not collected at all in 2006. If these kinds of surveys are repeated over the long term, we should be able to monitor insect populations and distributions in response to potential changes due to fire, climate, development, or unforeseen factors. We would also hope to detect the arrival of exotic insects, possibly in time for defensive measures.

Sorting, identifying, and understanding the arthropod fauna of the Kenai National Wildlife Refuge using the LTEMP samples has been part of my work for an M.S. in biology at the University of Alaska Fairbanks under Dr. Patricia Doak. The U.S. Fish and Wildlife Service, the University of Alaska Fairbanks, and Marathon Oil have graciously funded my work. I owe special thanks to Dominique Collet, who has shared his entomological resources and helped with identifications, and to Charlotte Hockin, who sorted over half of the specimens. Several others have helped with identifications.

Matthew Bowser has served the Kenai National

Wildlife Refuge for three years as a biological technician and STEP graduate student. He is currently pursuing an M.S. in biology through the University of Alaska Fair-

banks. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Bugging out: Intern learns more about Alaska than just lack of igloos

by Charlotte Hockin

When I accepted an internship in Alaska to study insects, I thought all my Christmases had come at once. I left England and a rather “tropical” 73 degrees in early autumn for almost 12 weeks in an Alaska winter wonderland.

The Kenai National Wildlife Refuge carried out a biological survey of its entire 2 million acres and one particular aspect within the project was an entomological survey. It was my job to assist Matt Bowser in the daunting task of sorting and identifying over 15,000 specimens, a number that is still in the process of being counted.

In Britain many of our insects and plants are commonly found when the viewer is out walking. A large number have already been described thanks to an explosion of naturalists in the late 1800 and early 1900s. This is the reason I immediately found Alaska entomology an exciting field to be a part of due to the sheer number of new and intriguing insects.

I soon developed a greater appreciation of flies and (dare I say it?) even a love for spiders. Perhaps that’s too strong a word but I do feel a pang of compassion for the unfortunate orb weavers sporting ichneumon larvae parasites on their abdomens. Likewise for the unfortunate slugs and snails who ended up as a tasty snack for a particular marsh fly (*Sciomyzidae*) which was present in much of our insect samples.

I soon learned more predator and host associations by simply observing species numbers from particular areas. For instance, in a spruce woodland sample there were both large numbers of the fungus gnat (*Mycetophilidae*) and the wasps (*Diapriidae*). The gnat’s larvae feed and burrow inside fungi until they pupate and hatch out as adults. The Diapriids hover around the fungi waiting to inject their eggs into the grubs, so that

their own larvae can feed. It’s a system that is species specific and has evolved over thousands of years. Finding these sorts of specimens and quantities indicates an efficient predator/host relationship and more importantly a healthy ecosystem.

Once the initial job was completed, I had the opportunity to investigate insects that overwinter under the snow, such as springtails (*Collembola*), ground beetles (*Carabidae*) and various soil mites (*Acari*). This was especially interesting for me because in England the snow generally melts after a few days and so our insects haven’t needed to evolve survival techniques such as antifreeze in the blood. They simply migrate to warmer climates, overwinter as pupa or hibernate.

My internship here has been extremely beneficial in many respects. I’ve had the opportunities to focus on specific taxonomic groups and learn more about their biology and identification characteristics. I’ve also developed my curator skills and learned new techniques such as pinning and preserving which will come in handy when I eventually become a qualified museum curator.

Just as importantly, I have had the chance to experience living in a developing city and to briefly be a part of its community, which I found to be extremely welcoming and immediately made many friends. I will be sad to leave but when I return home for Christmas I’m looking forward to showing friends and family my photos of Kenai and Soldotna so they can see that Alaskans do not all live in igloos.

I would like to thank John Morton, Matt Bowser and all at the National Kenai Wildlife Refuge for enabling me to work here and fully enjoy the experience.

Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Kenai Refuge introduces newest employee

by Rob Barto

After two years of planning, the Kenai NWR entered a new era of Law Enforcement by purchasing and training a Wildlife canine unit to be stationed in Soldotna but be available for details throughout the state. In October of 2004, I was detailed to Northern California where I met my new partner, Sampson. Sampson is a 2 year old Black Lab that had originally been selected for becoming a Canine Companion for those folks who are wheelchair bound. However, during the training it was discovered that Sampson was too energetic to properly perform his duties. In other words, he could not control his excitement to do the job at hand. This behavior may have prevented Sampson from becoming a Canine Companion, but it is exactly the type of behavior that is desired in a police canine. Training began with a simple game of fetch with tennis balls. Now, he trained to perform evidence recovery, wildlife detection, and tracking. When Sampson switches gears between tasks he wears a different collar and I use different commands. All tasks except tracking are done off leash with verbal commands keeping him focused on the area of the search.

To become certified in evidence recovery, Sampson must be able to locate three items in a 100 foot square covered with vegetation that is no less than 10 inches high in less than five minutes. The hidden items can be anything with human scent such as credit cards, knives, guns, tools, saws, wallets, etc. Once locating the item, Sampson is trained to lie with the item between his front paws. If the vegetation is especially thick Sampson is given a command to root out the item with his nose.

Certification in wildlife detection is similar to that of a narcotics canine. Prior to receiving our certification we must search and successfully find two separate wildlife samples (meat cooked or uncooked, hair, bloody clothes or gloves) in four different environments. Unlike evidence recovery, Sampson's indication for wildlife is to sit at the point the scent is the strongest and then it is up to me to locate the exact location of the sample. Building searches are done by placing wildlife samples in a residence. The samples can be hidden behind stoves, in washer/dryers, furnace vents, shelves, drain pipes, dressers, in short

wherever the certifying trainer wants to hide them. Prior to starting the search I put a green nylon collar on Sampson, give the search command and enter the residence where we search room by room until all articles are located and identified. There is no time limit on wildlife searches. Vehicle searches are very similar to building searches except we use a row of at least 7 cars and only two of them will have one sample hidden. It is Sampson's job to not only locate the car but pinpoint the location of the sample whether it's on the frame by the muffler or in a lunch box behind the driver's seat. Area searches are similar to evidence recovery. However, this time samples can be up in trees or buried under stumps, leaves, rocks, etc. There can be a time limit on this exercise depending on the size of the area, that last certification that we completed the trainer set two samples out in an area approximately 200 yards square and buried one of the samples in approximately three inches of dirt. The final wildlife search that we receive certification in is luggage searches. A cardboard box is used to simulate luggage and the test consists of at five boxes with only one of the boxes containing a sample. Additionally, during wildlife searches, the trainer can place domestic meat samples such as chicken, pork, or beef and Sampson is supposed to pass over the items and indicate solely on wildlife items.

Currently we are certified for detecting Moose, Brown and Black Bear, Caribou, Dall sheep, Mountain Goat, and Deer. I plan to add Polar Bear and Musk Ox to our plate this winter.

Probably the toughest certification that we receive is tracking or trailing of subjects who either lost in the woods or for whatever reason has decided to elude the police by running. Trailing certification is similar but is divided into three separate classifications. The novice trailer will trail a 10 minute old trail for one half mile over a vegetative surface with no other human trails present. The expert will use a trail 1 hour old covering one mile, start and end on vegetation but have 500 feet of the trail be on pavement. Finally the distinguished expert will start on a trail one hour old, cover 1 and ½ mile, run at least 500 feet on pavement, cross a stream, and have two fresh humans' trails crossing the

trail. A subject will remain at the end of all the trails.

His reward for all this work and training—a tennis ball.

As you can see having a canine partner is a lot of work and training, but there is no better experience

when Sampson finds the guy who ran or locates a crucial piece of evidence.

Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.

Soldotna Area Christmas Bird Count slated for Saturday, December 30, 2006

by Elizabeth Jozwiak and Jack Sinclair

The 107th annual Christmas Bird Count season is under way; tens of thousands of volunteer birders are scouring their designated areas in over 2000 circles this Holiday season throughout North America. Once again local birders from the Kenai/Soldotna area are invited to participate in the Soldotna Annual Christmas Bird Count to be held tomorrow.

The Audubon Christmas Bird Count (CBC) is an early-winter nationwide bird census, where volunteers follow specified routes through a designated 15-mile (24-km) diameter circle, counting every bird they see or hear all day. It's not just a species tally—all birds are counted all day, giving an indication of the total number of birds in the circle that day.

All individual CBCs across North America, including Canada, are conducted in the period between Dec. 14 to Jan. 5 (inclusive dates) each season, and each count is conducted in one calendar day in a given area. Birders from Seward, Anchorage, Homer, and other areas of Alaska also participate in this annual event.

The history of how the Christmas Bird Count began is quite interesting! The first CBC was done on Christmas Day of 1900 as an alternative activity to an event called a "side hunt" where people chose sides, then went out and shot as many birds as they could. The group that came in with the largest number of dead birds won the event.

Frank Chapman, a famed ornithologist at the American Museum of Natural History and the editor of "Bird-Lore," recognized that declining bird populations could not withstand this kind of over-hunting, and he proposed to count birds on Christmas Day rather than shoot them.

The data collected by observers on these Audubon Society Christmas Bird Counts over the past century have allowed researchers, conservation biologists, and interested individuals to study the long-term health and status of bird populations across North America.

In the 1980's, CBC data were used to document the decline of wintering populations of the American black duck, after which conservation measures were put into effect to reduce hunting pressure on

this species. The Soldotna Christmas Bird Count originated in 1983 with the center of the 15-mile diameter circle being the Kenai National Wildlife Refuge headquarters and covering most of the Soldotna area, including a good stretch of the lower and middle Kenai River.

Although the count was discontinued in 1992, it restarted in 1999 and has been running ever since with the dedication of local birder Jack Sinclair who has been the official compiler of the data each year. Some of the more common birds seen during the Soldotna CBC have been the bald eagle, black-billed magpie, common raven, assorted gull species, common redpoll, pine grosbeak, pine siskin and boreal and black-capped chickadee. Some uncommon species observed on the Soldotna count in previous years have included a northern shrike, northern hawk owl, and a white-crowned sparrow.

Homer birders conducted their CBC on December 16th, and had quite a number of unusual and rare sightings. The Kachemak Bay Bird Alert Information number (235-PEEP) reported that Homer participants observed a purple finch, red crossbills, cedar waxwings, and over 1000 rock sandpipers on the spit.

Birders, or anyone interested in participating in this year's Christmas bird count, should meet at the Kaladi Bros. Café in Soldotna at 9:00am so that birding groups can be assembled and observation areas assigned. Participants do not have to be experts, but only have a desire to get outside and look for birds. The birding effort normally concludes at dusk (about 4 p.m.) or when weather precludes any measurable returns. Inexperienced birders will be grouped with more seasoned CBC veterans to help familiarize them with where to go and what to look for.

Each participant should dress warmly, and try to bring a good set of binoculars and a bird identification book for species most often found in Alaska. You may also want to bring a camera to document any rare or unusual sightings. There is a \$5 fee per field participant which will help defray the cost of production and publication of the 107th Christmas Bird Count issue of

American Birds

No fees are charged for persons under 18 years of age, or for those planning to survey their backyard bird feeders during the Christmas Bird Count.

Anyone having an active bird feeder in the count area is encouraged to help. Counting the single highest number of a species at a feeder at any one time, including any unique feathered visitors, is a big help to the count.

For anyone wanting to pre-register, or just interested in the Christmas Bird Count, there is a wealth of information available online at www.audubon.org/bird/cbc/. The Soldotna bird count totals since 1984 are available to view here as well as every other bird count in North America during the last century.

After a great day of birding, all participants are invited to submit their tally sheets and birding photos

during a potluck social at 5:30 pm at the Kenai National Wildlife Refuge's Environmental Education log cabin located next door to the Kenai NWR headquarters/parking lot on Ski Hill Road.

For more information, contact Liz Jozwiak at the Kenai NWR 260-2818 or Jack Sinclair at 262-7817. Also, if you come across a chickadee or northwestern crow with an upward elongated curved (i.e., deformed) bill, please report it to us at the Kenai National Wildlife headquarters (262-7021). This information will contribute to an important regional study on the causes of bill deformities in southern Alaska.

Elizabeth Jozwiak is a wildlife biologist for the Kenai National Wildlife Refuge. Jack Sinclair is the area superintendent of Alaska State Parks. Previous Refuge Notebook columns can be viewed on the Web at <http://www.fws.gov/refuge/kenai/>.